THE SURGICAL CLINICS OF NORTH AMERICA

FEBRUARY, 1925

VOLUME 5—NUMBER 1

NEW YORK NUMBER

PHILADELPHIA AND LONDON

W. B. SAUNDERS COMPANY

PUBLISHED BI MONTHLY (SIX NUMBERS A YEAR) BY W B SAUNDERS COMPANY, WEST WASHINGTON SQUARE PHILADELPHIA

MADE IN U S A

CONTRIBUTORS TO THIS NUMBER

FREDERIC W BANCROFT M D Instructor of Surgery Columbia University Surgical Director Lincoln Hospital Formerly Associate Attending Surgeon New York Hospital

EDWIN BEER M D Visiting Surgeon Mt Sinai and Bellevue Hospitals

A A BERG M D Surgeon to Mt Sinai Bronx and Sydenham Hospitals Consulting Surgeon to Monmouth Memorial and Miriam Barnert Hospitals

WILLIAM B COLEY M D Surgeon in Chief Hospital for Ruptured and Crippled Attending Surgeon Memorial Hospital, Professor of Clinical Cancer Research Cornell University Medical College Memorial Hospital

CHARLES A ELSBERG M D Professor of Neurological Surgery Columbia University Consultant in Neurological Surgery Presbyterian Hospital Attending Surgeon Mt Sinai Hospital and Neurological Institute

CHARLES L GIBSON M D Professor of Surgery Cornell University Medical College, Attending Surgeon First Surgical (Cornell) Division New York Hospital

NATHAN W GREEN M D Associate Attending Surgeon St. Luke's Hospital, Attending Surgeon City Hospital

HOWARD LILIENTHAL M D Consulting Surgeon Bellevue Mt. Sinai and Joint Diseases Hospitals Consulting Surgeon New York Infirmary for Women and Children, Professor of Clinical Surgery Cornell University

OSWALD SWINNEY LOWSLEY M D, Director Brady Urological Foundation New York Hospital, Consulting Urologist Bellevue Peekskill Memorial Ruptured and Crippled Skin and Cancer Bloomingdale Nassau and Spring Lake and Long Branch Memorial Hospitals

JOHN J MOORHEAD M D Professor of Surgery and Director of Department of Traumatic Surgery New York Post Graduate Medical School and Hospital, Consulting Surgeon United States Veterans Bureau United States Marine Hospital No 70 and Harlem and Nyack Hospitals

EUGENE H POOL, M D Attending Surgeon, New York Hospital Consulting Surgeon French New York Eye and Ear New York Orthopedic and Reconstruction Hospitals Associate Professor of Surgery Columbia University

FRANCIS CARTER WOOD M D Attending Physician St Luke's Hospital and Director of the Radiotherapeutic Department St Luke's Hospital

CONTENTS

THE SURGICAL CLINICS
OF
NORTH AMERICA

Volume 5 Number 1

NEW YORK HOSPITAL

CLINIC OF DR EUGENE H POOL

EXOPHTHALMIC GOITER

DR NELLIS B FOSTER	**Diagnosis of Thyrotoxicosis**
DR HAROLD E B PARDEE	**The Heart with Thyroid Disease**
DR F J MCGOWAN	**Ante-operative Therapy**

THE patient is a man thirty eight years old His occupation is that of artist He complains of nervousness, prominence of the eyes, and swelling in the neck

The patient had always been well except for an attack of influenza seven years ago One year ago he began to have attacks of diarrhea, and seven months ago he noticed that he had become quite irritable and nervous and within a period of two days a swelling in the neck appeared and his eyes became prominent He thinks that the swelling of the neck has not increased in size since that time He consulted his family physician who advised him to rest in a hospital for two weeks This he did

His symptoms did not improve and he entered this hospital four months ago, at which time he was very nervous, had lost 35 pounds in weight, and had a marked tremor He complained

NOTE —All the Clinics in this number were given at the various hospitals during the meeting of the American Congress of Surgeons in New York last October The April number of the Surgical Clinics of North America will also be devoted to New York City and will contain all the Clinics given during the Congress not reported in this issue

also of diarrhea, palpitation, dyspnea, tachycardia, sweating, and loss of strength.

Physical examination at that time showed a marked degree of exophthalmos with accompanying signs—positive Von Graefe, Stellwag, Joffroy, Dalrymple, and Moebius There was an enlargement of both sides of the neck, more marked on the right, pushing the trachea toward the left The tumor was firm and moved upward on swallowing The heart was rapid and regular, with a soft systolic murmur heard best at the apex, rate around 110 The remainder of the physical examination was negative.

The patient's basal metabolism on entrance was plus 65 per cent., and he was put on Lugol's solution, 15 mm. t i d He also received sedatives such as luminal, sodium bromid, and codein After nine days' rest in the hospital his basal metabolism went down to plus 47 per cent At this time he was operated upon and a bilateral ligation of the superior thyroid vessels performed He made an uneventful recovery His pulse ranged from 100 to 128 after operation and was 100 on day of discbarge from the hospital

Six weeks ago patient was re-admitted to hospital and remained four days A tonsillectomy was performed by Dr. Erskine under local anesthesia The patient still had a rather marked degree of hyperthyroidism, with a pulse ranging from 90 to 106

Four weeks after the tonsillectomy the patient was re-admitted. After three days' rest in the hospital his basal metabolism was 46 per cent He had improved since his previous admissions However, he still had a rather marked exophthalmos, some tachycardia, and swelling of the neck He has gained 16 pounds in four months and now weighs 142.

The patient on this last admission was examined by Dr Nellis B Foster, who noted the following improvements: not so restless, pulse 86, tremor diminished, but the exophthalmos and goiter not noticeably changed.

The patient has been on Lugol's solution, 7 mm. t. i d , for the past two weeks.

Laboratory Findings—Urine negative R B C, 5,000,000 Hgb, 78 per cent W B C, 6000

Polys neut, 50 per cent Lymph, 48 per cent Large mononuc, 2 per cent

Urea nitrogen, 16 1 mg per 100 c c Blood sugar, 0 145 per cent

DR POOL (operating) We do a subtotal thyroidectomy A curved incision is made about 1 inch above the sternoclavicular joint, reaching between and somewhat overlapping the sternomastoid muscles The deep fascia is cut through on a plane a little higher, the large veins in it being ligated and tied

The fascia is dissected well upward, exposing the depressor muscles which are divided in the midline and retracted Occasionally they are divided The pyramidal lobe is here well developed and is divided above the isthmus The right lobe is freed from the trachea above the isthmus by placing clamps and cutting between them The pole is cut across and the lobe may now be lifted The object now is to cut across the lobe, leaving only a small part of it posteriorly, then across the isthmus, leaving a layer of thyroid on the trachea, which avoids irritation of the trachea which occurs after a close dissection The other lobe is treated similarly, removing thus a butterfly piece of tissue representing the two lobes and isthmus The dissection is done by placing clamps on the tissue to be cut and dividing between the clamps There is usually quite a little bleeding, but this is controlled by mass ligatures passed through the tissues with a needle When the field is dry the muscles are repaired, the fascia sutured, and the skin closed with clips We always drain such a case There is usually considerable discharge Since the adoption of Lugol's solution as an ante operative measure we have not left any of these wounds open for secondary suture, which was formerly a frequent practice

If any of you have questions to ask I shall try to answer them

QUESTION What do you sew it up with?

DR POOL I sew it up with No 1 or 0 plain catgut

QUESTION What anesthetic have you been using?

DR POOL The anesthetist started on ethylene but shifted

also of diarrhea, palpitation, dyspnea, tachycardia, sweating, and loss of strength.

Physical examination at that time showed a marked degree of exophthalmos with accompanying signs—positive Von Graefe, Stellwag, Joffroy, Dalrymple, and Moebius. There was an enlargement of both sides of the neck, more marked on the right, pushing the trachea toward the left. The tumor was firm and moved upward on swallowing. The heart was rapid and regular, with a soft systolic murmur heard best at the apex, rate around 110. The remainder of the physical examination was negative.

The patient's basal metabolism on entrance was plus 65 per cent, and he was put on Lugol's solution, 15 mm t i. d He also received sedatives such as luminal, sodium bromid, and codein After nine days' rest in the hospital his basal metabolism went down to plus 47 per cent. At this time he was operated upon and a bilateral ligation of the superior thyroid vessels performed. He made an uneventful recovery His pulse ranged from 100 to 128 after operation and was 100 on day of discharge from the hospital

Six weeks ago patient was re-admitted to hospital and remained four days A tonsillectomy was performed by Dr. Erskine under local anesthesia. The patient still had a rather marked degree of hyperthyroidism, with a pulse ranging from 90 to 106

Four weeks after the tonsillectomy the patient was re-admitted. After three days' rest in the hospital his basal metabolism was 46 per cent. He had improved since his previous admissions. However, he still had a rather marked exophthalmos, some tachycardia, and swelling of the neck He has gained 16 pounds in four months and now weighs 142.

The patient on this last admission was examined by Dr. Nellis B. Foster, who noted the following improvements: not so restless, pulse 86, tremor diminished, but the exophthalmos and goiter not noticeably changed.

The patient has been on Lugol's solution, 7 mm. t. i d., for the past two weeks

consists in partial resection of each lateral lobe and the isthmus, making the neck symmetric

(2) Puberty hypertrophy is a diffuse swelling often seen in young persons, especially girls Microscopically, the picture is that of colloid goiter The swelling may be controlled by small doses of iodin, as suggested by Marine

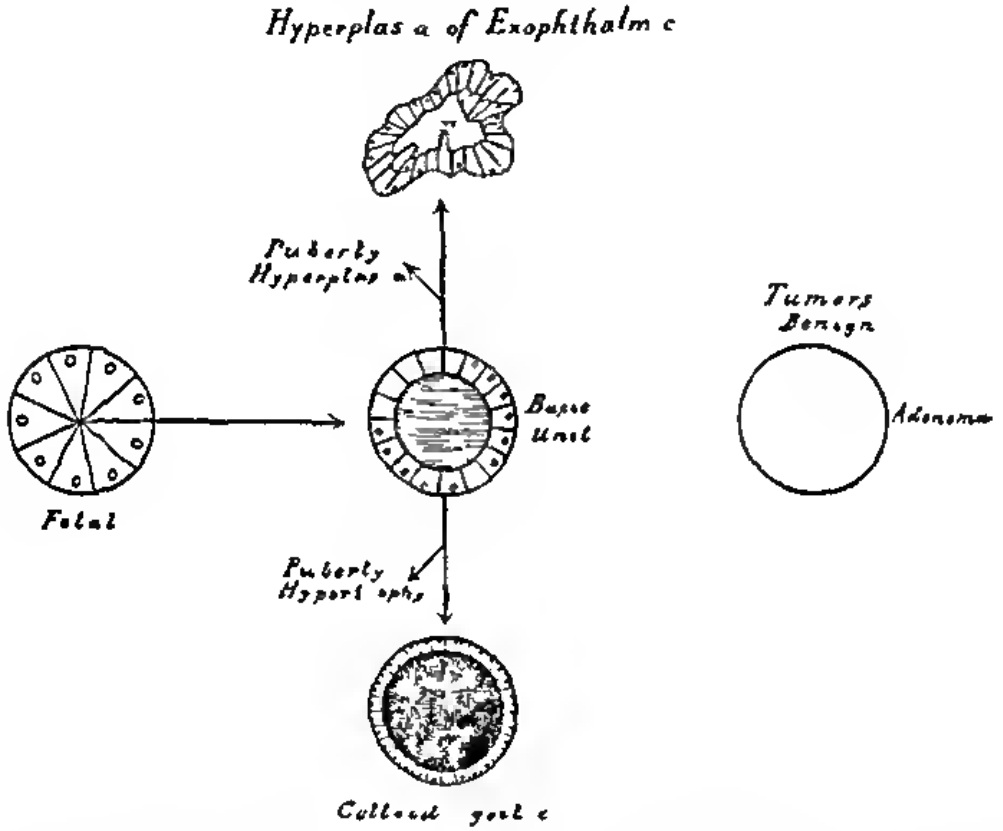

Diagram to represent the usual clinical types of goiter Diminished activity of the gland is represented below the normal unit Increased activity is represented above the "normal unit," or basic unit Adenoma is a benign tumor in the thyroid and not a diffuse lesion of the parenchyma The classification eliminates all artificial groups and unessential subdivisions in order to simplify this discussion

(3) Puberty hyperplasia must be differentiated from the preceding It is not frequent Symptoms are similar to those of slight exophthalmic goiter Iodin should not be administered to these cases They should be treated by rest, as in exophthalmic goiter They should not be operated upon Before administering iodin to a young person for a diffuse swelling of the

neck, look for toxic symptoms, the occurrence of which suggests that the condition is puberty hyperplasia rather than puberty hypertrophy.

(4) Adenomata These are single or multiple, small or large, encapsulated benign tumors within the thyroid gland. They may demand treatment for cosmetic or mechanical reasons, or because of toxic symptoms Especially in long standing cases toxic symptoms may develop, suggestive of those of exophthalmic goiter Adenomata should not be treated with iodin or *x*-ray. These measures will accomplish nothing. Surgery is the only effective treatment The single nodule without toxic symptoms may be enucleated Cases with toxic symptoms or multiple nodules should be treated by resection of the two lobes to prevent the development of small unrecognizable adenomata after the enucleation of the larger ones, with recurrence of symptoms.

(5) Exophthalmic goiter is a polyglandular disturbance. The thyroid usually, but not always, shows a definite histologic picture. Some of the rare exceptions to this I will show you. Experience has shown that there is justification for attacking the disease through the thyroid and no real justification for attacking it through other organs The usual histologic picture suggests hyperactivity of the parenchyma, with the secretion passing rapidly into the circulation instead of being stored in the acini, as in colloid goiter The early course of the disease suggests a profound toxin Subsequently, permanent changes in the heart and other organs are added to the picture. Therefore, it is important that the treatment of the disease should be begun and completed before permanent changes have occurred.

Cutting down the activity of the gland by vascular ligation, *x*-ray, or resection has been shown to be of benefit. These therapeutic measures should be undertaken, however, early in the disease

Treatment.—A case should be handled by a medical man. The essentials are rest and proper feeding for a long period, with symptomatic administration of drugs. These patients are burning assimilated foods, as well as their tissues, faster than these can be replaced. In spite of a large diet, even 5000

calories daily the patients often emaciate They do not do well until they start treatment The basal metabolism estimation should be made in all cases It is important as a matter of diagnosis prognosis and treatment Septic conditions as diseased tonsils and carious teeth should be removed It may often be found that they prevent improvement

Rest may be employed in early cases for a period of not more than four months when it should not be persisted in unless the improvement is marked and lasting

Operation is in most cases the best means of combating the disease It should be preceded by rest and other medical measures It should not be employed during an exacerbation The patient should be prepared by the free administration of fluids and glucose In severe cases a graduated operation may be done Ligating one or both superior poles first and resecting the two lobes of the thyroid approximately two months later when the average gain is usually greatest The improvement from ligation is generally not lasting

The administration of Lugol solution which contains iodin 7 to 15 mm. three times a day for seven to ten days before operation lowers the basal metabolism usually renders the postoperative hyperthyroidism controllable and makes the operation relatively safe so that resection may be performed as an initial step

Operative treatment demands resection of both lobes and isthmus leaving only a small portion part of each lateral lobe. The recurrent nerves and parathyroid glands are thus conserved.

DIAGNOSIS OF HYPOTHYROIDOSIS

DR. WILLIAM B. FOSTER

In the few minutes allotted to me I wish to discuss briefly the three fundamental questions in diagnosis of thyroidosis from the surgeon's point of view These questions are (1) Is the disorder an intoxication of thyroid origin? (2) What is the degree of intoxication? (3) Is there any complicating

disease? On the answer to any one of these questions depends the character of the treatment indicated in a case and the time when a therapeutic measure may or may not be carried out.

There is at the present time considerable perplexity, especially among surgeons, as to criteria in the diagnosis of thyrotoxic states In typical cases of exophthalmic goiter, when all of the signs are well developed, there is not apt to be any mistake in identifying the disease Error occurs in that group of cases where some important sign is absent, and these mistakes are made by surgeons and internists alike, because too much weight is given to an obvious abnormality. Accompanying the thyroid syndrome there is a profound disorder of the vegetative nervous system, and upon evidence of this nervous disturbance we customarily rely to some extent on diagnosis of thyroid disorders. It is sometimes forgotten that there are many types of disorder of the vegetative system, not in any known way related to thyroid function For example, I doubt if anyone would care to sponsor a theory that all tremors and tachycardias are expressions of thyroid influences Excluding cases due to organic disease of the nervous system and of the heart, there are well-defined clinical syndromes, of which tremor and rapid pulse are the prominent signs. Neurocirculatory asthenia is of such a character. Now if a case of this disorder occur in combination with a small goiter our judgment is at once thrown out of balance We are obsessed by the evident goiter and, since two other symptoms of the Graves syndrome, tachycardia and tremor, are present, we rush to a conclusion, heedless of inconsistencies in the clinical picture as a whole.

That the tachycardia of the neurosis subsides during sleep, while that of thyrotoxicosis, dependent upon elevated metabolism, does not, is a distinction which may not be overlooked. While due care will obviate many mistakes yet there are cases where the various signs are so misleading that diagnosis may be made only through laboratory aids. One common cause of confusion is that mental or emotional strain aggravates the symptoms in autonomic imbalance in predisposed individuals; may, indeed, be the first cause of symptoms, and these same

emotional stresses so often seem to precede the development of true thyrotoxicosis Gains and losses in weight are misleading, a woman with a worry will lose weight and a woman possessed of a good digestion will gain weight, in spite of Graves' disease of considerable severity

Now the importance of differentiating cases of colloid goiter complicating autonomic imbalance lies in the fact that operations on the thyroid do harm Any operation, even needed operations often seem to shatter the delicate adjustments of these neurotic persons—I am aware that a few surgeons believe they benefit these cases by partial thyroidectomy From observations of a good many cases that have been operated upon, I am strongly of a contrary opinion

Since the final test in differentiation between thyrotoxicosis and autonomic imbalance is an estimation of the basal metabolism, I wish to say a word about this method of study As a means of learning something about rates of oxidation in the body there can be no conflict of opinion among the well informed The difficulty lies in the fact that estimations are really difficult to make The technic is not simple, and even with the best of apparatus and the greatest care it is not always possible to detect that the patient is under tension and therefore not in a basal state With all of these possible sources of error it is often necessary to make second observations before a dependable result may be secured In simple instruments and rapid methods I have no faith Better to depend on pure clinical judgment than rest secure on a doubtful laboratory result because it is expressed in figures When, however, reliable and concordant results are secured, the metabolic rate is the most important single fact in the diagnosis of thyroid disorders Other diseases cause increased metabolism, but, with the exception possibly of pituitary disorders, all are easy of detection

The degree of intoxication in thyroid syndromes is important to know, especially if surgical treatment is contemplated It is the consensus of opinion based on experience that cases with very severe intoxication do not endure operations well and that a period of preliminary treatment is essential While one may

gain a fair idea of the condition of the patient in this respect from such data as the pulse-rate, digestive function, and nervous tone, yet it is true that the impression as a whole lacks definiteness, and comparative impressions with other cases are vague, and impressions are misleading. Therefore, basal metabolism studies are of the greatest service in formulating a judgment. For the scientific study of this disease no other method now known can serve the same purpose. For example, it has happened repeatedly in our clinic here that following removal of infected tonsils the condition of the patient has shown a vast improvement There might be a considerable gain in weight and abatement of the conscious nervousness. In some of these cases it seemed, no doubt, judged by general examination, that the basal metabolism would be lower since the notable evidences of intoxication were less. It is interesting then to find that there is no significant change in metabolism, which means, of course, that while the patient is improved yet no change in the basic disorder has occurred. In the study of chronic diseases the most difficult task is to differentiate between an increased sense of well-being in the patient and improvement in the disease. We inveigh against the "cures" of quacks and faddists and fall ourselves into the trap by judging an outward improvement as due to a real remission in a disease, and often we go further and delude ourselves that the remission was induced by a pet therapeutic agent. These are the fields where crucial tests are most important

From the point of view of surgical hazard. a metabolism 70 per cent. above normal indicates a risk that had better not be taken, certainly not until rest and iodin treatment have been tried On the other hand, when the rate is below 60 per cent. over normal there is no special hazard; but, of course, this means that there are no other factors to be considered. If there is a complicating cardiac or renal disease, a patient with but 30 per cent. elevation of metabolism may be a worse risk than another with no complication and a rate of plus 60 per cent.

The most common complication in all types of thyroid disease is heart disorders, and the most common cardiac disorder is

total arhythmia, auricular fibrillation A completely irregular pulse is usually an ominous sign to the surgeon, though its significance is not of necessity portentous While auricular fibrillation may be a sign of grave myocardial disease, in many cases it indicates only transient disorders In some cases it is paroxysmal But auricular fibrillation introduces an extra hazard in any surgical operation, an unnecessary hazard, too, since usually a normal rhythm may be restored by proper treatment I cannot here go into the methods of accomplishing this end, it must suffice that they involve rest, complete digitalization, and the proper use of quinidin after there is no longer evidence of cardiac incompetency In this clinic we have had no case of fibrillation in the last two years where it has not been possible to restore normal heart action before operation

THE HEART WITH THYROID DISEASE

DR HAROLD E B PARDEE

Most of the cardiac abnormalities of goiter occur in patients with an elevation of the metabolic rate The primary effect upon the heart of increased metabolic rate is to produce tachycardia Besides this, the apex beat feels sharp and violent, the first heart sound is loud There may be a faint blowing systolic murmur at the apex The pulse is full and strong and the blood pressure may be raised These changes are quite similar to those resulting from exercise, which also causes an increased metabolism They are not evidence of a damaged heart, but only *of overactivity*

If these patients complain of palpitation on exertion or of dyspnea on exertion, and of abnormal fatigue, it is not surprising and should not be taken as an indication of myocardial disease, for the metabolic demand of effort is added to an already raised metabolic level, so that there is a considerable demand upon the reserve of the heart to remove the waste products The heart must beat more rapidly to maintain the circulation with this increased metabolism, and it may thus become fatigued and may fail in the performance of its function for this reason

We are not dealing with a diseased myocardium, but with one which is overworked.

This condition tends to cause an enlargement of the heart. In the early stages this enlargement is probably a dilatation of the chambers, for this is the physiologic mechanism to enable them to carry on increased work. Later there is a thickening of the muscle of the ventricles.

The most striking and most serious effect of toxic goiter upon the heart is the development of auricular fibrillation or auricular flutter There may be paroxysmal attacks alternating with normal heart action or auricular fibrillation may be persistent. It is persistent auricular fibrillation that is the common cause of heart failure in the course of thyroid disease I have seen but one thyroid case with heart failure who did not also have auricular fibrillation She had a definite aortic insufficiency of rheumatic origin. Hamilton, of Boston, has reported a series of 50 goiter patients with various degrees of heart failure Thirty-nine of these had persistent auricular fibrillation and 9 had repeated attacks of paroxysmal fibrillation Two did not have auricular fibrillation, 1 of these had chronic nephritis with marked hypertension, and the other had tuberculosis with polyserositis, so that it seems that the development of heart failure with goiter is intimately associated with the development of auricular fibrillation, and does not appear without it unless some other disease causing heart failure is present. It is particularly noteworthy that we do not see the chronic fibrous myocarditis with heart failure and normal rhythm which is so common from arteriosclerosis.

Auricular fibrillation may exist in goiter patients, however, without its leading to heart failure Especially in severely toxic cases, and especially after thyroid operations, it may occur as a part of a general severe toxemia. It is not then associated with cardiac failure even though the patient may die.

Goiter patients with heart failure due to auricular fibrillation present a somewhat different problem from the ordinary cardiac patient, for they often do not react so well to digitalis. The ventricular rate is less easily controlled than in other pa-

tients with auricular fibrillation In the postoperative toxic cases this is especially likely to be the case, digitalis seeming to have little or no ability to slow the very rapidly beating ventricles This is because the vagus, the medium through which digitalis acts to slow the heart, is paralyzed in these patients Quinidin is often successful in abolishing the auricular fibrillation in these cases, and the ventricular rate may be somewhat slowed by this Plummer has shown that the postoperative toxic reaction can be largely prevented by the administration of iodin, so that by this procedure we may avoid serious difficulty

There are many goiter cases with auricular fibrillation, however, who are as much improved by digitalis as any other case with a like degree of cardiac failure, so that the drug should always be tried After the cardiac failure has been improved as much as possible, I believe then an attempt should be made to abolish the fibrillation with quinidin If the attempt is unsuccessful then the goiter should be operated upon in spite of residual signs of heart failure These patients bear operation surprisingly well with the present technic The cardiac condition always improves greatly after the toxemia has been reduced by operation and some patients then spontaneously cease to have auricular fibrillation

Cardiac complications are not confined to the severe toxic cases Simple adenoma without increase in basal metabolism is also associated with a tendency to cardiac abnormality Coller, of Ann Arbor has reviewed a group of 300 patients with adenomatous goiter and without hyperthyroidism, having a basal metabolism less than 115 per cent (15 per cent above normal), and he found that with each advancing decade there was an increasing percentage with *tachycardia* with *cardiac enlargement*, and with *auricular fibrillation*

This, of course, would be true of any group of individuals because of the common tendency of hypertension and arteriosclerosis to produce these things with advancing years, but the frequency of occurrence of these symptoms is much greater in the goiter group than arteriosclerosis and hypertension could possibly account for In the fifth decade 74 per cent showed

tachycardia, 45 per cent showed cardiac enlargement, and 4 per cent. showed auricular fibrillation. In the sixth decade 79 per cent showed tachycardia, 50 per cent. cardiac enlargement, and 30 per cent auricular fibrillation.

It appears from these figures that there is something connected with the presence of even the so-called "non-toxic" adenomatous goiters which predisposes to tachycardia and to cardiovascular disease

I believe that it is the tendency to tachycardia that eventually leads to the cardiovascular changes, for a rapid heart-rate means that the myocardium has less time for rest and recuperation between beats, and that the arterial walls are subjected to additional strain. The tachycardia is probably the result of a low grade of overactivity of the thyroid. There may also be some toxic action of the thyroid secretion upon the heart muscle.

The tendency for these patients with non-toxic adenoma to develop hyperthyroidism increases with age. Coller found that of all goiter patients the percentage in each decade with abnormally high basal metabolism increased from 0 in the second to 11 per cent in the third, 30 per cent in the fourth, and 32 per cent. in the fifth

It appears that a person with goiter may have hyperthyroidism any time after the late twenties, and from then onward has an increasing chance of developing this complication Even without plain evidence of hyperthyroidism the tendency to various cardiovascular disturbances increases year by year in goiter patients, so that for both of these reasons goiters should not be temporized with.

Here we have an indication for the prevention of the "goiter heart." Remove the goiter if the metabolism is increased, and even without an increased metabolic rate, if the heart-rate tends to approach 90 or more per minute The tachycardia is evidence that the heart is being affected by the goiter and the end-result of this will be organic changes in the heart.

As an illustration of some of the points I have mentioned, I would like to present to you a case that has been followed for about four years. She is now thirty-one years of age and has known

that she has had "heart trouble" since she was twenty years of age Prior to this she had not suffered from any serious illness and had been free from rheumatism and joint pains, and had only rare sore throats as a child She had always been considered nervous, but never had chorea In 1919 she had acute articular rheumatism In 1920 she had an attack of influenza, and following this a swelling appeared in the neck and her heart trouble became worse, so that she had dyspnea on such lights effort as walking a few blocks and palpitation from even less effort In 1921 she came to the cardiac clinic, where she was found to have rheumatic valvular disease with mitral stenosis and insufficiency, and moderate cardiac enlargement The heart action was rapid 130 per minute, and showed the irregularity typical of auricular fibrillation There was moderate edema of the legs below the knee, the liver was enlarged the neck veins engorged, and the lungs showed rales at the bases There were thus definite signs of cardiac failure

Besides this, the thyroid gland was much enlarged There was evident nervous instability and tendency to flushing and a considerable degree of tremor

She was given 1 dram of tincture of digitalis by mouth at once and directed to take 20 minims twice daily She was to rest in bed at home and to limit her total fluid intake to 1 quart daily She returned in a week much improved The heart rate was now 108 per minute the edema was less the liver was smaller, and the venous engorgement less There were also fewer râles at the bases and she found that her mind was better than when she came a week ago The thyroid symptoms were unchanged and sleeplessness was troublesome, so that she was given a mild sedative—10 grains of sodium bromid and 3 grains of chloral hydrate—to take every four hours The cardiac treatment was continued unchanged She made three more visits to the clinic, but did not continue to gain satisfactorily, and so it was thought best for her to enter the hospital, a thing she had refused at the start of her treatment

With proper rest and digitalis she improved greatly in two weeks, so that there were no objective signs of heart failure

The auricular fibrillation persisted though, and so she was given quinidin sulphate, 6 grains every four hours. This caused considerable palpitation and giddiness, but after four doses the first day and two the next the fibrillation gave place to a normal regular rhythm with a rate of 100 per minute. This remained, the rate varying between 108 and 90, and she was finally discharged to a convalescent home.

While in the hospital her basal metabolism was found to be 162 per cent. (+62 per cent. above normal), and she presented a typical picture of hyperthyroidism with moderate exophthalmos, thyroid enlargement, nervousness, ready flushing, and considerable tremor Operation was thought inadvisable, and she was given two *x*-ray treatments by Dr Remer before discharge At this time she weighed 117 pounds The subsequent course of her treatment, her weight, basal metabolism, pulse-rate, and cardiac condition are shown in the table on page 17

For the most part her heart retained the normal rhythm, but in November and December, 1921, and March, 1922 she relapsed to auricular fibrillation, but each time was promptly restored to normal rhythm by the use of quinidin. She has continued as an ambulatory case and took the quinidin at her home, stopping it when the normal rhythm appeared. This she was able to recognize by the disappearance of the palpitation, which she always felt when auricular fibrillation was present. In November, 1923 the fibrillation reappeared, but she did not come to the clinic until January, 1924 At this time she presented a picture of moderate heart failure with tricuspid insufficiency, large pulsating liver, and engorged veins of the neck, but without râles in the lungs or edema.

She had gained 9 pounds in weight since June, 1923 and looked almost fat. She refused to enter the hospital, but obeyed instructions in regard to resting at home, so that by March 8th, under digitalis and rest, visiting the clinic four times, her compensation was well restored. She refused to enter the hospital and we refused to give her quinidin as an ambulatory patient. Her compensation was well under control with digitalis, but the fibrillation continued From March 1st to June 1st

	Date	Weight	Heart rhythm	Heart rate	Basal metabolism	x-Ray treatment.
1921	June	117	A F		162	
	July	117	A F			xx
	Aug		N	120		x
	Sept		A F *			
	Oct		N	120	168	x
	Nov		A F *	108[1]		
	Dec	127	A F *	96[1]		
1922	Jan	130	N	100	150	x
	Feb		N	96		
	March	133	A F *	100[1]	145	
	April	N				x
	May		N			
	June	131	N	102		
	July		N		131	
Not under observation	Aug		N			
	Sept		N			
	Oct		N			
	Nov		A F			
	Dec		A F			
1923	Jan	140	A F			
	Feb		A F			
	March		A F			
	April		A F		138	x
	May		A F			
	June		A F		130	x
	July		N	90		
	Aug		N	84		
	Sept		N	90		
	Oct	149	A F *			
	Nov		N	96	131	
	Dec		N	84	121	
1924	Jan	145	A F *			
	Feb	148	N	90		
	March		N	120		
	April		N			
	May	148	A F *	96[1]		
	June		N			
	July		N			
	Aug		N			
	Sept		N			
	Oct	144	N	84	131	

[1] Rate was xxx, counted when normal rhythm was present

A F * = Attack of auricular fibrillation abolished by quinidin

N = Normal rhythm

x = One x ray treatment

A F = continued auricular fibrillation

she took sufficient tincture to keep her heart-rate between 70 and 80 when at rest, 1500 minims in all, which is an average of 17 minims per day, rather less than the usual average amount necessary for this effect

During June she consented to enter the hospital and quinidin restored normal rhythm on the fourth day with a dosage of 6 gr every four hours, except for the midnight and 4 A. M. doses From this time until the present she has been very well She continues to gain weight and the basal metabolism has fallen to 120 per cent (+30 per cent above normal) She has had three attacks of auricular fibrillation, as seen in the table; each terminated after a day or so by the use of quinidin at her home

This patient is now considerably overweight. She still has moderate exophthalmos, moderate tremor, moderate nervousness, and a moderate thyroid enlargement She has the valvular disease, and this is well compensated, but, worse than this, she has the tendency to develop auricular fibrillation

She well illustrates how favorably thyroid patients react to quinidin, it having been uniformly successful in returning her heart to normal rhythm with rather small doses Her response to digitalis has also been favorable on each occasion when it was needed, the rate having been slowed and the compensation regained With normal rhythm she retains her compensation well, but the tendency to recurrent attacks of auricular fibrillation shows that the heart is continually subjected to abnormal influences, and these in time will probably lead to muscle degeneration The present level of the basal metabolism, 131 per cent (31 per cent above normal), shows that the thyroid is still overactive, and I feel that this patient should now be operated upon. The tendency to develop fibrillation is diminished by partial thyroidectomy, and it is most desirable to do away with the thyrotoxic influences, to which her heart is subjected, before the cardiovascular system has been seriously damaged Medical care and *x*-ray therapy have done a great deal for this patient, but it has seemed to me since January, 1924 that the indications for operation have been more definite than for waiting

DR. POOL I will now show you a few postoperative thyroid cases which illustrate certain unusual features.

Case I. Carcinoma of Thyroid.—On March 25, 1923 this woman of forty-seven came in with a large mass in the neck. It was stony hard and involved the thyroid. She had a basal metabolism of plus 17. The diagnosis nas carcinoma. Operation was performed and the thyroid removed except a small part of the left lobe, which was so attached to the trachea as to make its excision impossible The histologic picture was car-

Fig 1.—Case 1 Carcinoma of thyroid before operation

Fig 2.—Case 1 Carcinoma of thyroid nine months after operation

cinoma She has had *x*-ray treatments since operation (Figs. 1, 2). She has now a very small mass in her neck corresponding to left lobe. The reason why this patient is shown is as an evidence that it is worth while to operate on these patients because some of them will have a long period of comfort. It is now about eighteen months since operation and her health is perfect She has, as yet, no evidence of metastases. Of course, these will develop in time.

Case II. Exophthalmic Goiter in Child.—The next case is a boy of fifteen. In some young people there occurs pronounced

hyperplasia of the thyroid Five years ago this boy fell downstairs, and he was dreadfully frightened, just before onset of symptoms It is said that his neck began to swell in a few days and that his eyes began to protrude He had on admission the classical Grave syndrome very marked (Fig. 3). We did not operate on him, but had him treated with x-ray. He still has some prominence of the eyes, but nothing in comparison with what he had At the time he came to us he was a wild, nervous, excited exophthalmic case with marked tremor. His basal metabolism was not taken. He is now in good condition with

Fig 3.—Case II Exophthalmic goiter in boy of ten (not operated upon)

Fig 4.—Case II Shown three years later Complete relief of all symptoms and disappearance of signs

no symptoms (Fig. 4). His basal metabolism on his last report was minus 16, so that instead of being a hyperthyroid case he has a deficiency now of the thyroid and must have some thyroid therapy.

Case III. Lymphocytic Thyroid.—The third case is a woman who was twenty-seven years old when she came in. She had been ill for eight years. She had had a double ligation in another hospital eight years before she came here. Three months after the ligation she married against advice, had a baby, and all her symptoms came back very rapidly. She should have

Fig 5 —Case III Exophthalmic goiter (lymphocytic type) Bilateral ligation eight years previously

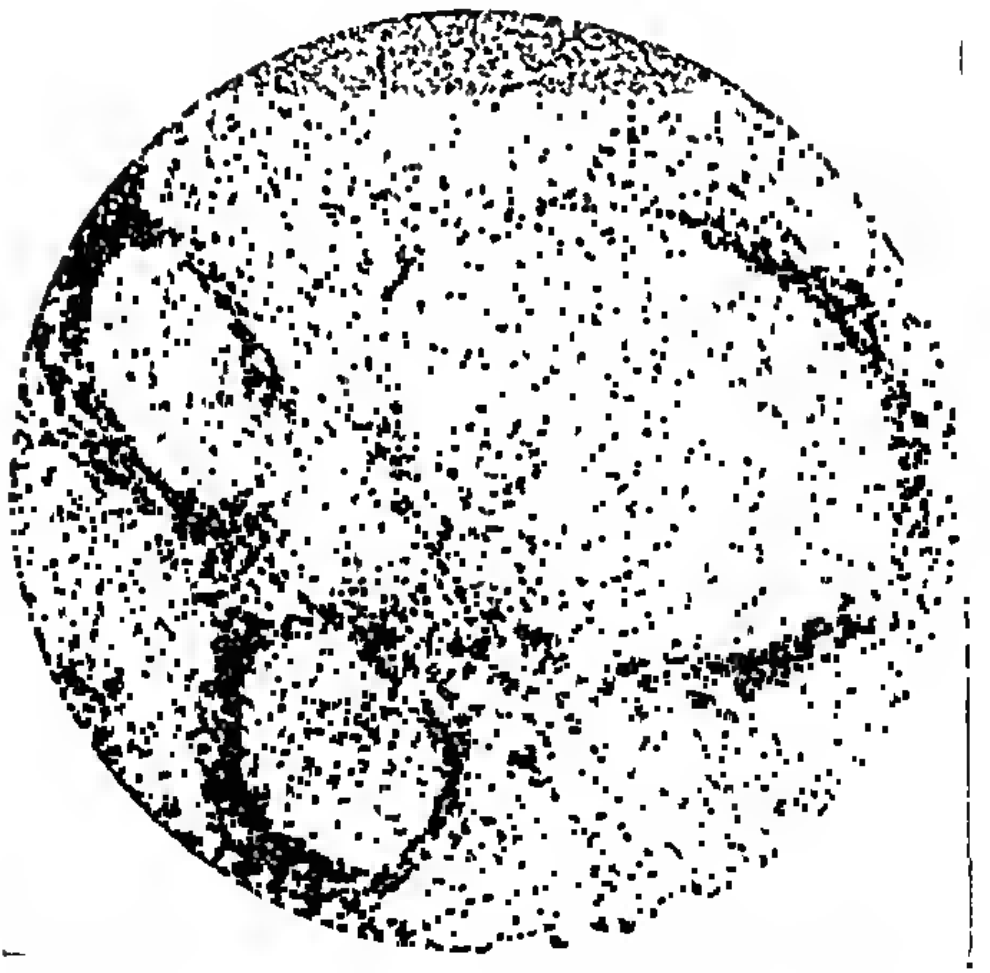

Fig 6 —Case III Microphotograph of specimen removed from Case III, showing almost no thyroid tissue Marked lymphocytic infiltration

Fig 7.—Case III. Eleven months after subtotal thyroidectomy.

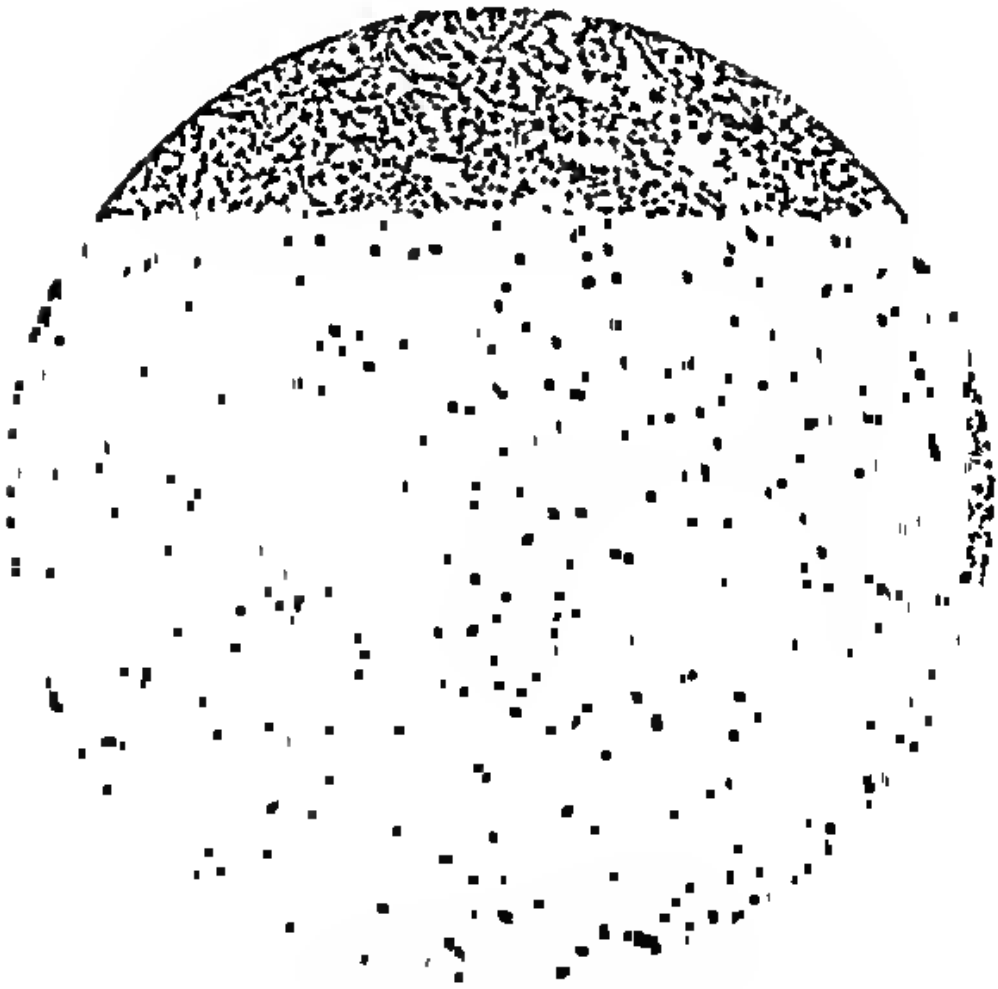

Fig 8.—Case IV. Hyperplasia of thyroid showing enormous nuclei

Fig 9 —Case IV Same case as shown in Fig 8

had a resection a few months after the ligation while she was still benefited by it, because, if resection is not done then, most cases will have recurrence of symptoms She went bad and remained for seven years in this condition until she came here (*Fig 5*) She had all the symptoms—increased basal metabolism, etc —of exophthalmic goiter We performed a subtotal thyroidectomy The thyroid consisted, for the most part, of lymphoid tissue There was almost no thyroid tissue This is a very peculiar picture Instead of the typical hyperplasia there was a lymphocytic infiltration (Fig 6) Since operation she has gained 40 pounds in weight, is feeling well, and has no tremor (Fig 7). She was operated on in February, 1923. The fact that she had this very peculiar histologic condition in the thyroid, and that she was not operated on until seven years after ligation, makes her an unusual case

Case IV. Unusual Histologic Picture (*Giant Nuclei*).—This patient came to the hospital in August, 1922, at the age of nineteen years, with all the symptoms of exophthalmic goiter. Her thyroid was resected. The slide shows irregular acini, elongated cells, and you will see that the entire mass of thyroid is marked with enormous nuclei, suggesting a very hyperactive condition of those cells (*Figs. 8, 9*)

This patient has gained 27 pounds and has felt well since operation. Another surgeon had previously ligated the superior poles in this case, making a very low incision, so when we came to resect we struck the scar tissue, making it one of the most difficult resections I have done. This, then, is a warning not to do a low pole ligation if resection is to follow.

Case V.—Lantern slides. These lantern slides are from a case in which a malignant thyroid was removed (Figs. 10, 11) I

Fig 10.—Case V. Carcinoma of thyroid.

Fig 11.—Case V. Carcinoma of thyroid after operation

wish to emphasize that there is no type of tissue or lesion in pathology in which it is so often difficult to render a diagnosis microscopically as is the case of carcinoma of the thyroid You may take some fetal adenomata and show slides to a pathologist and he will say that they are definitely malignant tumors Take

some carcinomata of thyroid and show sections and he will often feel that they are not carcinoma. So you must not send a specimen to the laboratory and expect the pathologist to make a correct diagnosis from a frozen section, without considering the clinical features of the case. The pathologist can help you, but often he cannot make a diagnosis from the sections. Diagnosis in these cases must be made from the clinical and histologic findings together. This patient died six months after opera-

Fig 12 —Case V. *x*-Ray of chest showing metastases following carcinoma of thyroid

tion with metastases throughout the thoracic region (Fig. 12). The pathologist reporting on the tissue removed at operation did not consider it malignant (Fig. 13), but we knew from every point of view clinically that it was a carcinoma. If the pathologist finds cells invading the blood-vessels, he can make the diagnosis. Of course, there are many cases of carcinoma of thyroid, and I shall show you slides of several in which there can be no question of diagnosis

There is another type of condition extremely rare We have had, so far as we can find, 3 cases in New York City. The patient to whom I refer had a very small thyroid. Dr. Lefferts made a laryngoscopic examination and reported that the trachea was pressed in from both sides, the left side a little more than the right The condition was shown later to be exactly as he

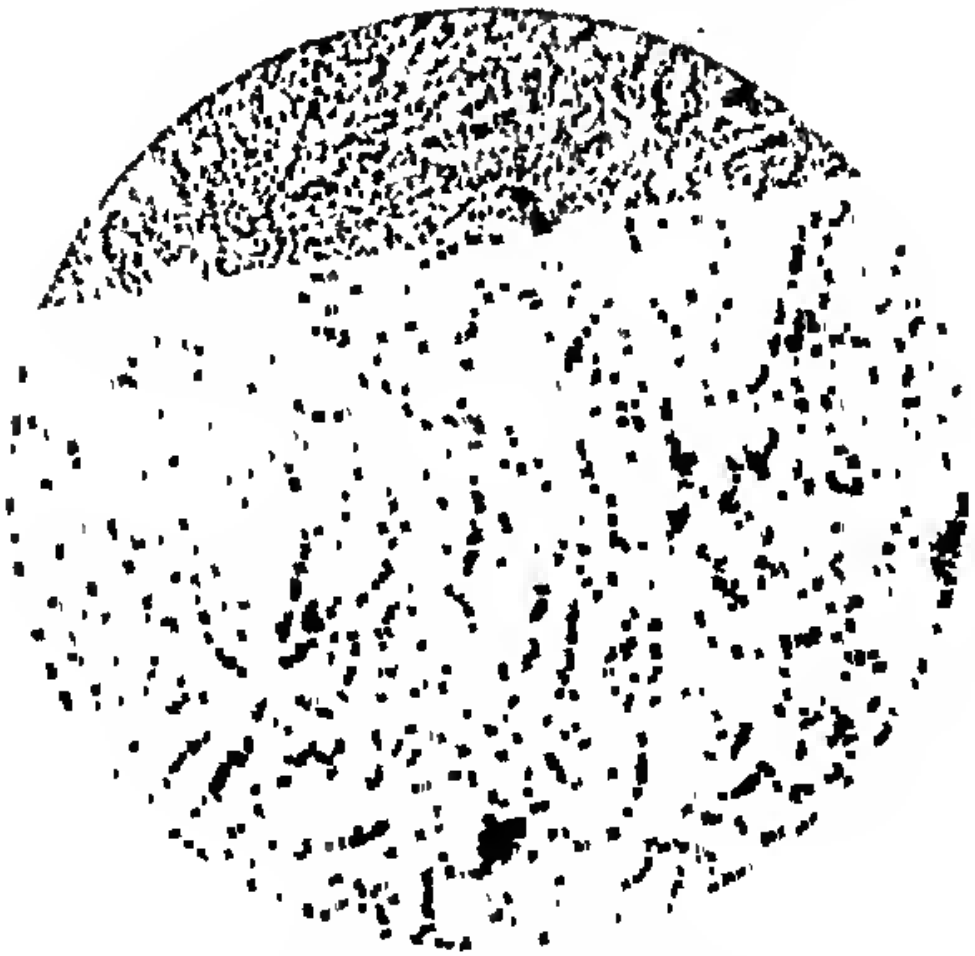

Fig 13 · Histologic picture from case of carcinoma of thyroid.

described it. It was just as if the trachea were pinched between the thumb and forefinger. Dr W. T Bull did a tracheotomy, and about the fifth day the tube sloughed through the wall of a vein and the patient bled to death At autopsy the thyroid was smaller than normal, each lobe about 1½ inch long. Microscopic examination showed that it was nothing but scar tissue. We do not know the cause of this, but here we had a

Fig 14 —Thyroid tissue practically replaced by connective tissue

thyroid practically entirely replaced by the connective tissue (Fig 14)

Case VI Hypothyroidism Following Subtotal Thyroidectomy —*The next case* Kathleen S *came in November 1921,* with a marked exophthalmic goiter, markedly increased basal metabolism, and all the classical signs She was very toxic and desperately sick She was given x ray treatments Then she had a tonsillectomy Later subtotal thyroidectomy was done Since then she has had a low basal metabolism as low as minus 17 By November 6, 1922 the patient had grown very fat and had not menstruated since her operation She was given thyroid extract Her basal metabolism at that time was minus 11 She was later given thyroid and ovarian extract, after which

she began to menstruate. She had been a very toxic case, but the *x*-ray treatments and the thyroid removed cut her thyroid tissue and thyroid secretion down too much. I am inclined to think that if you are going to operate, you should not give *x*-ray treatments. I think, with iodin (Lugol's) as a preparation, you may omit *x*-ray therapy altogether. A few years ago we thought the *x*-ray should be tried in selected cases I believe in this case the *x*-ray had put out of commission what little thyroid was left at operation. Now she has very little tremor, is working, and is in splendid shape.

I show a postmortem specimen taken from an exophthalmic case The parathyroids were dissected out very carefully. There are two types of cells in the parathyroids, the significance

Fig 15.—Pa ...ypes of cells, principal and oxyphil

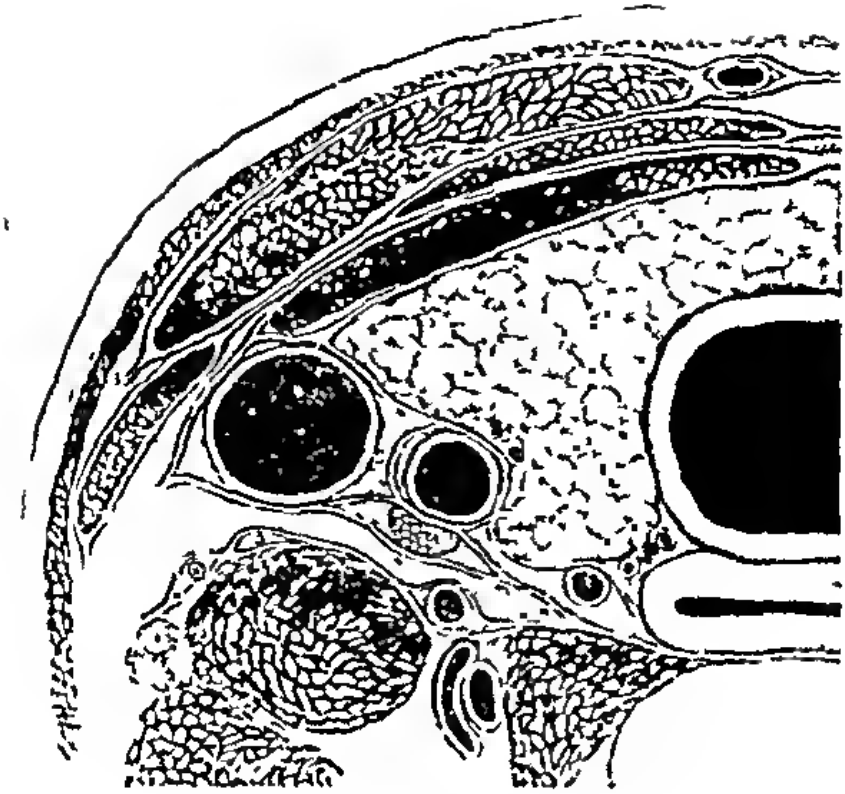

Fig 16 —Cross-section of neck

Fig 17 —Cross section through a parathyroid

of which has not been shown (Fig 15). I present also a cross-section of the neck (Fig. 16) and cross-section through a parathyroid (Fig 17). These illustrate the anatomy [illegible] in thyroidectomy of the

Case VII. Injury to Trachea.—In the next patient whom I show you the trachea was cut open transversely. I did it. She was a very sick girl She came to us in August, 1923, with a basal metabolism of plus 75 per cent (Fig. 18) She had the ligation of the superior vessels on August 13th, and on November

Fig 18.—Case VII Picture before operation when basal metabolism was +75 per cent

Fig 19.—Case VII Thirteen months after subtotal thyroidectomy for exophthalmic goiter (injury to trachea)

20th, three months later, she had the resection. What did we do when we found the trachea cut? Did we do a tracheotomy? We did not We sewed the opening up fairly well, then took the depressor muscles and sewed them down on the opening and left the remainder of the wound open. She did so

well that on the fourth day we sutured the wound. In the year following she has gained 22 pounds in weight. She has very little tremor now. Her eyes have improved and she is very well. She does all her own house work (Fig. 19).

In closing we will present briefly 2 interesting cases. One is mine, the other Dr. J. Remer's. They contrast well, 2 intrathoracic tumors.

Case VIII. Intrathoracic Colloid Goiter.—My case is an unmarried woman of forty-five, who was admitted to the hospital on July 28, 1924. She came into the hospital complaining of a goiter of fifteen years' duration, and of dyspnea and an in-

Fig 20.—Case VIII. Intrathoracic goiter showing dilated cervical veins.

creasing sensation of pressure in her neck. The family history is negative.

The past history shows that the patient's habits are regular, that in the past she has heen suhject to acute tonsillitis, and has had a great deal of dental work done.

Her present illness hegan fifteen months ago, when she first noticed a goiter. The most prominent symptom was swelling of the neck. She has had no toxic symptoms. The dyspnea

and sense of pressure in the neck started one year ago and rendered her extremely uncomfortable

Physical Examination—An obese, florid-faced woman of middle age, lying quietly in bed, with a large swelling of the anterior neck region evident Skin negative. Head negative. Eyes: No suffusion, pupils normal, ocular movements normal; no eye signs Neck very large and covered with tremendously dilated veins (Fig 20) Thyroid itself is enlarged and resilient

Fig 21.—Case VIII Intrathoracic goiter, *x*-ray of chest showing tumor.

on palpation Chest shows many dilated veins over upper chest wall

x-Ray showed a large shadow within the thorax, which was interpreted as an intrathoracic goiter (Figs. 21, 22). Laryngologic examination by Dr. Erskine negative. Rest of examination essentially negative

Operation—Partial thyroidectomy for intrathoracic goiter.

Pathologic Report—Three lobulated cyst-like masses of the thyroid tissue, each about 6 cm. in diameter, also two similar masses, one 5 cm., one 3 cm. Section: The findings characteristic of colloid goiter

Fig 22 —Case VIII Intrathoracic goiter *x* ray of chest (lateral)

Fig 23 —Case VIII Intrathoracic goiter *x* ray of chest after operation for comparison with Fig 22

Patient had an uninterrupted convalescence and wound healed by primary union. A subsequent *x*-ray is here shown (Fig. 23).

Fig 24.—Case VIII Intrathoracic goiter (three and a half months after operation)

Her follow-up has been satisfactory and she is entirely free from her former symptoms (Fig. 24).

Case IX. Sarcoma (?) of Thymus Gland.—The patient is a male thirty-three years of age, whose present illness began in January, 1923, at which time the patient began to feel tired, had nervous symptoms, and developed a cough In fact, he seemed to get one cold after another He was able to work, however. Six weeks ago he found himself unable to sleep at night and would have to sit up or get up His cough was severe and he would become cyanosed during coughing He had frequent vomiting after coughing or after eating He worked up to the day of admission. He had been having difficulty in swallowing, also, and could eat almost no solid food except when he swallowed it with the aid of water He was admitted September 13, 1923.

Physical examination revealed a well-developed and well-

nourished man of about thirty-five years of age, lying fairly restfully in bed, breathing somewhat heavily, coughing occasionally with a cough characterized by a brassy, hollow tone He has raised blood streaked sputum There is noticeable cyanosis of the face and neck and a slight cyanosis of the chest, with the lower limit at the xiphoid The lower border is sharply demarcated at the level of the xiphoid process Small capillaries at the lower border of the cyanosis are sharply outlined Over the neck and chest are numerous dilated veins Posteriorly, the cyanosis is less marked There is flatness over the left side of the chest, extending from the clavicle to the fifth rib Below there is resonance Dulness on the right side to 3 cm from the midline in the first space, $4\frac{1}{2}$ cm in the second, $5\frac{1}{2}$ cm in the third Tactile fremitus absent over this area of dulness Breath sounds over the dull area are very distant

In the axilla the breath sounds are vesicular, but somewhat obscured by coarse, low pitched ronchi On the right side there is normal resonance and fremitus Breath sounds are obscured by ronchi Posteriorly, there is resonance over all areas Tactile fremitus present throughout Breath sounds are vesicular, but obscured by coarse ronchi, which are present over all areas Both arms are slightly cyanotic The veins are distended The legs appear to be rather thin in proportion to the size of the hips No edema of the ankles No deformities With regard to the lymphatics, several small inguinal nodes palpable There is a hard node, the size of a hazelnut, in the left axilla

The roentgenologic report showed "Mediastinum and both lungs obscured by a large shadow, whose shape suggests a lobed condition No evidence of inflammatory reaction around the tumor" (Fig 25) The fluoroscopic findings showed a large shadow filling about two thirds of the chest and apparently outside and above the heart, which is pushed down and does not seem to be enlarged The shadow does not pulsate and only bulges slightly in posterior direction

Patient was given radiotherapy under the direction of Dr J Remer. For details of treatment see below

Thirteen days later the roentgenologic report read "Tumor

Fig. 25.—Case IX Sarcoma (?) of thymus. Chest x-ray on admission September, 1923

Fig 26.—Case IX. Sarcoma of thymus. Chest x-ray in December, 1923

of mediastinum is contracted in every dimension. Lung shows beginning fibroid changes."

Second Admission—The patient was readmitted October 18, 1923 for a second course of x ray therapy Remarkable improvement resulted from the first treatment and the patient appeared very comfortable

Physical Examination—*Chest*—Movement with respiration is equal on the two sides Lungs Resonant throughout, except in region of sternum There is dulness over the entire sternum and to right and left Right border of dulness extends

Fig 27—x Ray on August 1924 Sarcoma (?) of thymus Chest plate August 1924

about 1 cm beyond sternal margin Left border in the first space is $4\frac{1}{2}$ cm, second space $6\frac{1}{2}$ cm third space 9 cm Breath sounds over lungs are vesicular and clear Heart Apex beat not palpable Left border of percussion dulness is 10 cm from midline in fifth space Sounds are slow and deliberate At the base they are muffled No murmurs heard

x Ray Report—"Mediastinum is materially narrower and denser There is considerable peribronchial fibrosis also" (Fig 26)

Fluoroscopic.—"The shadow in mediastinum is very much smaller. Heart enlarged."

Course.—Marked clinical improvement has continued. (For last x-ray see Fig 27.)

William M.—*x-Ray Treatment, First Series:*

1923

Sept. 18. Voltage, 200,000
M. A., 4.
Distance, 50 cm
Time, 45 min.
Filter cu. $\frac{1}{2}$; al. 1 mm.
Amt. to skin, $56\frac{1}{2}$ per cent. of erythema exposure.
Area, back.

Sept. 19. Voltage, 200,000.
M. A , 4
Distance, 50 cm
Time, 15 min
Filter cu $\frac{1}{2}$; al 1 mm
Amt , $18\frac{1}{2}$ per cent of erythema exposure.
Area, back.

Sept 20: Voltage, 200,000
M A , 4
Distance, 50 cm
Time, 30 min
Filter cu $\frac{1}{2}$, al 1 mm
Amt., $37\frac{1}{2}$ per cent. of erythema exposure.
Area, Ant chest.

Sept. 24. Voltage, 200,000
M. A , 4
Distance, 50 cm.
Time, 10 min
Filter cu $\frac{1}{2}$; al 1 mm
Amt , $12\frac{1}{2}$ per cent. of erythema exposure.
Area, Ant. chest.
Total depth dose to tumor, 75 per cent.

Second Series

Oct 18 Voltage, 200,000
M A , 4
Distance, 50 cm
Time, 45 min
Filter cu $\frac{1}{2}$, al 1 mm
Amt $56\frac{1}{2}$ per cent of erythema exposure
Area back

Oct 22 Voltage 200 000
M A , 4
Distance, 50 cm
Time 45 min
Filter cu $\frac{1}{2}$, al 1 mm
Amt $37\frac{1}{2}$ per cent
Area, Ant chest
Total depth dose to tumor 61 per cent

DR POOL These 2 cases are shown because of their interesting chest roentgenograms Dr J Remer's case is a very unusual one and the late follow up will be very interesting

ANTE OPERATIVE THERAPY

DR F J MCGOWAN

The subdivision of therapeutics designated by the term "ante operative therapy' includes first of all the general and special examination of the patient and second the preparation of the patient for the prescribed surgical procedure The first part of the subject the examination of the patient, is intimately connected with the subject of diagnosis and will not concern us The second part of the subject the fundamentals underlying the preparation for operation as practised on Dr Pool's Division, will be our main consideration

More and more surgeons are realizing the great importance of the ante-operative and the postoperative care of the patient We are realizing that the preparation and after care of patients

subjected to laparotomy or other major procedures involves fully as much responsibility as the technical steps of the operation itself. On Dr Pool's service we have been intensively interested in this phase of surgical treatment, going over our experiences, studying our end-results, standardizing our ward orders and routine as far as possible, and slowly working toward the ideal of comprehensive team play, wherein we may, first, bring the accurately diagnosed patient to operation in his best possible physical condition; second, prevent or anticipate operative and postoperative complications, and, third, insure the patient intelligent after-care and subsequent direction

It is necessary that the patient be under observation for several days prior to operation. During this period the patient is studied; intercurrent infections are detected, personal idiosyncrasies are uncovered, constitutional diseases are checked up, and any lesions contraindicating surgery are disclosed and the patient advised as to them This period is especially valuable in children in obscure illnesses with abdominal symptoms, as a guard against operating during the early development of some acute infectious disease

Every patient admitted has

1. Complete history and physical examination
2. Urinalysis and complete blood-count
3. Wassermann and blood-pressure.

The various other tests are performed when indicated, *e. g.*, basal metabolism, renal function, *x*-ray, etc The patient is examined by the intern and attending staff, laboratory data are reviewed, and the question of operation decided upon If there are minor lesions susceptible of treatment, as carious teeth, secondary anemia, residuals of recent acute infections, etc, this is arranged for If it is the consensus of opinion that the patient's general condition could be improved by a régime of medical supervision or a short stay in the country, this also is arranged

With operation decided upon and with the patient in as good general condition as we can expect, our problem is to take charge of the patient as an individual and supervise his routine

and to anticipate and prevent as far as possible postoperative complications With regard to the first, we can take this up best by a consideration of the various systems

1 Gastro-intestinal —Ordinary cases receive full House diet on admission Gastric cases receive diets modified to suit the particular case Thyroid cases, those with thyrotoxicosis, receive a diet of high caloric value calculated to meet the increased demands of their disease—18 to 28 calories per pound of body weight, depending upon the basal metabolism Diabetic patients receive a carefully weighed diet calculated from their size, laboratory findings and severity of the disease, which diet is calculated to render their urine sugar free and to reduce their hyperglycemia, with or without the addition of insulin, as the severity of the disease demands Save in emergencies, it is our duty to get these patients sugar free and on a maintenance diet before we are justified in submitting them to operations under general anesthesia Jaundiced patients are placed upon a fat poor diet to meet their gastric intolerance Other conditions that may complicate the surgical disease, such as hypertension chronic nephritis, etc , are put on appropriate diets Fluids are allowed in full amounts and patients are encouraged to drink sufficient amounts of water, 1500 to 2500 c c , to establish a good water exchange Fluids are allowed up to within two hours of operation This provides to some extent for the fluid loss at operation and tends to minimize postoperative thirst All patients are provided with a mouth wash, Dobell's and toothbrush to cleanse mouth and teeth after eating and their use is insisted upon Cases where there is vomiting as in obstruction at the pylorus, are lavaged regularly, and always just before operation This systematic lavage results in a cleaner operative field in gastric operations, improves the tone of the stomach wall and so tends toward the patient's comfort, and lessens gastric distention and acute dilatation after operation Moreover, patients with gastric retention, no matter how much they dislike their first lavage, often welcome the second because of the comfort they experience We do not believe in brisk catharsis before operation Rather, we employ a mild cathartic,

cascara or licorice powder, given forty-eight hours before operation, followed by a hot soapsuds enema in the morning. The diet on the day before operation is cut down, and on the morning of operation the patient receives a second enema This procedure conserves intestinal tonus, while satisfactorily cleansing of the gastro-intestinal tract, and does not favor postoperative tympanites. In many cases where the bowels have been moving regularly an enema on the morning of operation is the only treatment. In rectal cases it is important to irrigate the lower bowel thoroughly until grossly clean, for all too often is the surgeon forced to stop his operation and give an irrigation in the operating-room when the preparation has been faulty.

Cardiovascular System.—In the absence of valvular lesions associated with cardiac insufficiency, or symptoms of impaired heart muscle function, there is no need for any of the so-called cardiac stimulants or tonics In the presence of cardiac insufficiency and particularly in that type of arythmia—auricular fibrillation—digitalis in physiologic amounts is a *sine qua non* in our preparation By physiologic amounts we mean the dose necessary to produce an improvement in all the properties of the heart muscle in the individual patient An approximate method of arriving at an average dose is to give 1½ minim per pound body weight. This amount is best given in two or three doses by mouth. Following the administration of this amount we must examine the patient, test the rhythm and rate of the heart, and estimate the *quality* of the muscle contraction. Then we must order further amounts as may be deemed necessary to attain and maintain the digitalis effect We employ the tincture by mouth in most cases, and endeavor to get a real effect several days before operation. Last-minute doses of digitalis are to be avoided, especially by the intravenous route. In cases where we give digitalis intravenously we use the preparation digitan, furnished in ampules of 1 c c, which is equivalent to 1 *c c of a potent tincture* In *questionable* or borderline cases an estimate of heart muscle function, as determined by the exercise tolerance, should bear more weight in our decision than the number or nature of the valvular lesions We are

seeing more and more every day how very well patients with chronic cardiac valvular disease, without decompensation or a recent history of decompensation, stand operations under general anesthesia

Respiratory System—Acute lesions, even very slight, of the respiratory organs, whether of the upper air-passages or the lungs, are decided contraindications to operations of election, even under local anesthesia Old tuberculous lesions may be relighted under the stimulation of a general anesthetic We cannot emphasize this point too strongly

As has been noted, all cases are instructed in, and practice, oral hygiene All patients must be protected with warm clothing It has long been the custom in many hospitals to remove all the patient's clothing on admission and dress him in a light suit of cotton pajamas or a nightgown The patient is not accustomed to this change, and the articles do little in the way of maintaining body heat We are establishing, under Dr Pool's direction, a system whereby patients are provided, on admission, with suitable warm woolen garments, as near as possible to what they are accustomed to wearing, which will maintain body heat and protect patients from drafts, garments to which patients have been accustomed, and in which they will go to the operating-room, in order that they may be thoroughly protected from the surface evaporation during operation, and the profuse sweating with surface chilling postoperative

Genito-urinary System—Patients are encouraged to drink liberal amounts of water, and where they cannot co operate their oral intake is augmented by fluids given by rectum or subcutaneously When there are pathologic urinary findings, and always when there is a suspicion or history of a coexistent nephritis, the renal function is estimated by means of the standard tests Those we use are blood chemistry, excretion of phenolphthalein, estimation of output and concentration by the nephritic test-day Women who apply for interval operations are admitted in their intermenstrual period This seems a small matter, but it is surprising how often scheduled operations must be canceled and time lost through failure to ascertain this

point All pelvic cases in females are made to void or, if they cannot void, are catheterized before going to the operating-room, and the amount charted for the operator's information.

Skin.—Patients have a full tub-bath on admission, and when possible should receive a warm tub-bath, protected from drafts, the night before operation. In abdominal preps special attention should be given to the umbilicus, a nidus of infection. The routine preparations are:

Laparotomy (the night before).—Soap and water shave. Rinse with warm water Cleanse with alcohol and ether, dry. Paint with 3½ per cent iodin. Sterile dry dressing and bandage.

Pelvic.—Soap and water shave. Sterile douche.

Varicose Veins.—Soap and water shave, including groins. Wash with alcohol and ether; dry. Dry sterile dressing and bandage.

In addition: Results of Trendelenburg's tests are also to be charted With a bandage around thigh, prominent veins are traced with gentian-violet for operator's information.

Bone Cases.—Soap and water shave. Rinse with warm water Cleanse with alcohol and ether; dry. Apply equal parts lime and soda for five minutes Wash and apply D. S. D., and bandage

We have seen no burns after iodin

Nervous System.—Mental equilibrium is important This is particularly true in cases of thyrotoxicosis In these cases we attempt to practice the technic so well developed by Crile These patients should be accustomed to the operating-room, the anesthesia apparatus, the operating gowns, etc., and Dr. Pool makes a practice of postponing operation on these cases when they enter the operating-room in a more than usually nervous condition These patients should be carried along with sympathetic assurance and instruction until they can be brought to the operating room without excitement and are able to take the anesthetic smoothly and quietly. Our preparation should proceed in an orderly and systematic manner Elaborate, obvious preparation defeats itself. Distressing home or social conditions are put into the hands of our efficient social service, and the patient, who is often the main support of the family, or

the mother of young children, is relieved of all anxiety during the period of hospitalization Sleep the night before operation is important, and in the nervous patients must be secured by the administration of one of the hypnotics We have used chloral hydrate, 10 to 15 gr , in warm milk by mouth and find it very useful At times, but not as a general rule, we employ premedication to anesthesia The combination of morphin and atropin aids in a smooth quiet induction and goes far to control faucial and pharyngeal secretions We must endeavor in our observation of the patient to rule out hysteria and the psychoneuroses as far as possible These are to be particularly guarded against in patients with vague abdominal or pelvic complaints for it may be said that as a general rule good results after surgical operations are greatly interfered with

In addition to directing the patient's routine during his stay we must, when operation is decided upon, direct our attention to the possible postoperative complications which we should endeavor to anticipate or minimize

Shock —Some degree of shock is common to all major surgical operations, varying of course, with the nature of the procedure Shock is favored by having the patient enter the operating room in a frightened or terrified state, and taking a disturbed, noisy anesthesia This we must combat before operation by instructing and reassuring the patient, by providing for sleep the night before operation, and by premedication to anesthesia Beyond this, order and noiseless routine in the operating room and a skilful anesthetist can work wonders Shock is also enhanced by dehydration, especially carbohydrate depletion This we meet by providing ample fluids to within a short time of operation, and by providing carbohydrate in the form of lemonade and orangeade with lactose When, for some reason, the intake by mouth is interfered with, we augment the total intake by administering fluids by rectum and subcutaneously By rectum we give 4 to 6 ounces of tap water or 5 per cent glucose solution every three to four hours By hypodermoclysis we use sterile saline or 5 per cent sterile glucose solution In the major procedures, where shock is so often present, it is well

to provide the patient with a subcutaneous store of fluid and carbohydrate by means of a hypodermoclysis given just before operation This provides a reservoir of readily available fluid and carbohydrate to combat the depletion of operation Body heat must be maintained before, during, and after operation to guard against surface evaporation with chilling. This we meet by providing woolen garments next to the skin, which will soak up the secretions and yet not be cold and wet.

Pneumonia.—Respiratory infections are the bane of surgery and the concern of every operator. Great advances have been made along the lines of surgical technic and diagnosis, but postoperative pneumonia still claims its share of a small, but certain, number of patients. The advent of ethylene will be watched with interest as to the incidence of postethylene pulmonary complications. The developments and popularizing of local anesthesia, especially with regard to abdominal surgery, are encouraging. Pneumonia, or the various acute pulmonary inflammations, whether due to the direct irritation of the anesthetic vapor, to inhalation of septic materials, to emboli, to the chilling of the body surface, or to the direct infection by the pneumococcus, are always serious. In our preparation we must work for cleanliness of the mouth, maintenance of body heat, control of the secretions of mouth and pharynx during operation. smooth anesthesia, and avoidance of drafts and exposure postoperative. As to the use of digitalis, the opinions of authorities differ. Whether digitalis in physiologic amounts given to the ordinary patient with a relatively normal cardiac mechanism does act in any preventive measure, it is difficult to state The action of digitalis on the pulmonary circulation in man has not as yet been worked out satisfactorily. On Dr. Pool's service we have been inclined to digitalize certain types of patients, such as obese, plethoric, middle-aged females with biliary tract pathology, and cases of hyperthyroidism where tachycardia has persisted despite prolonged rest in bed. Without any statistical or scientific data we feel that many of these patients have been benefited We have seen no bad results as a result of the medication

Hemorrhage —Accidental operative hemorrhage cannot be avoided, but when anticipated, as in a radical mastectomy or extensive dissections, we can furnish patients with a supply of fluids by means of ante operative hypodermoclysis In one type of patient, the jaundiced, ante operative preparation is indispensable and often life saving In these patients, in addition to the complete blood count, the bleeding and clotting times are tested We have used two measures in the direct treatment, often combining them These are

1 Infusions, 200 to 300 c c of a 0 2 per cent solution of calcium lactate, given once or twice a day over a period of two to three days

2 Repeated small transfusions, 300 to 500 c c of whole blood, by the Unger method

During the preparation we frequently check our clotting time, and when it has been reduced to within normal limits we operate and always provide that a donor of a suitable group be near at hand for any emergency A test of value is the determination of the icterus index as published by Bernheim This test gives us accurate information as to the increase or decrease of jaundice much more rapidly than can be estimated by the appearance of the patient, and hence will give the lead to wait on a patient when repeated tests indicate a decreasing jaundice

A few words as to the preparation of emergency cases Here we must make the most use of the time we have, and our preparation if not orderly, will only add more disquiet to an already disturbed and upset patient who often is rushed to the hospital at night time

Our history and examination of the patient should be done as swiftly as is compatible with thoroughness, the essential laboratory work performed as rapidly as possible Shock must be quickly recognized and treated Dehydration, as is so classically seen in intestinal obstruction, should be combated by the early administration of large amounts of glucose or saline solution under the skin Accompanying lesions of heart and lungs should be searched for in order that we may select the

anesthetic agent of choice. With symptoms of cardiac insufficiency the patient should be speedily digitalized, preferably by mouth where there is no vomiting, or, in urgent cases, by vein. When there is time a tub- or sponge-bath should be given. The operative field is to be thoroughly prepared. When there is no contraindication an H. S. S. E. is effectual in evacuating the lower bowel Lavage of the stomach is helpful in removing the remains of the last meal Certainly the patient should not be sent to the recovery room after operation without being lavaged under anesthesia

Many of these observations are very commonplace and familiar Being familiar and simple, they are often neglected. We still see in our large clinics patients coming to operation frightened and often in terror, allowed to witness the bustle and confusion of the operation-room preparations, patients poorly prepared, with foul mouths, dehydrated, and inadequately clothed On our Division we are guilty of many of these faults, but we are striving to correct them Death analyses and follow-up results bring home the great need for more careful attention to the many details so necessary to ensure a successful result. *It is to this end that ante-operative therapy, a small part of general surgical therapy, is directed.*

MT SINAI HOSPITAL

Clinic of Dr A A Berg

THE RADICAL SURGICAL CURE OF GASTRIC AND DUODENAL ULCER

ASSOCIATES

Dr Eugene Klein — Some Gastric Motor Phenomena

Dr Burrill B Crohn — Chemism of the Stomach After Operation.

Dr A A Berg Before proceeding to operate on the cases we have this afternoon I want to introduce my associates, Dr Eugene Klein and Dr Burrill B Crohn who will have something to say on the subjects we are considering today

SOME GASTRIC MOTOR PHENOMENA

Dr Eugene Klein

Surgical procedures upon the stomach may be followed by two types of quite unwelcome sequelæ On the one hand the pathologic lesion for which they are performed may persist, or a new one may even be superadded (as a gastrojejunal ulcer), and, on the other hand there may follow unfortunate motor disturbances The physiologist in his study of the functions of the stomach, has not kept pace with the surgeon It was therefore not surprising that at first the surgeon regarded the stomach as a hollow rounded organ from any part of which he could with impunity cut a piece and then sew up the resulting defect But empiric experience soon showed that this could not be done successfully, although even today we cannot with any certainty answer why I wish briefly to discuss one or two of these motor disturbances following certain gastric operations

To anyone who studies the motor phenomena of the stomach

the need for some working hypothesis to co-ordinate the facts already known soon becomes very apparent. For myself, I have adopted the following one. Thus far, I believe, it satisfactorily explains many of the phenomena of normal and pathologic gastric motion I do not advance it as a permanent theory; I merely mention it as a useful conception to aid in the further study of the gastric mechanism.

The stomach may be divided into two parts; first, the body and fundus, and, second, the antrum. In a rough way these correspond to the auricle and ventricle of the heart, the fundus and body serving as the reservoir and the antrum as the motor On the lesser curvature at the cardia it seems probable that there is a node in which is initiated the normal course of gastric peristalsis Groups of ganglion-cells were first described here by Openchowski, and then later Keith found what he believed to be nodal tissue. Leading down from this center there is a conduction system along the lesser curvature Keith came to that conclusion mainly from anatomic studies, and Alvarez from a long series of experiments with muscle from all parts of the stomach

For our present purposes it makes no difference whether this is a tract of specialized tissue, or merely the most irritable portion of the gastric musculature or of the intrinsic nervous mechanism At any rate, it seems probable that the propagation of the gastric wave is normally accomplished by an impulse passing down the lesser curvature From some experimental work of others and of my own I believe it justifiable to add further the following:

Each portion of the greater curvature always contracts with the same part of the lesser. In other words, peristalsis is the contraction of the successive circular rings of muscle tissue from above downward I do not mean, of course, that these rings are anatomically defined, but, in the sense described above, the same part of the lesser, the lateral, and the great curvatures always contract simultaneously as the wave passes down the stomach Now, we know that the lesser curvature is the most irritable part of the stomach. I believe, then, that as the impulse

passes down the lesser curvature it successively reaches the rings of circular muscle and as it reaches each ring it furnishes the stimulus for the whole of it to contract In that way we have the progression downward of a peristaltic wave

Next, it seems probable that the antrum has a separate nodal center at its beginning on the lesser curvature, that is, at the re entrant angle Dr Berg has come to this conclusion from clinical experience, and there is some experimental evidence also in favor of such a belief Independent waves may, for instance, start at this point and pass down to the pylorus They do not start at any part of the antrum, but always at the angle

Let us consider a common pathologic lesion—an ulcer of the lesser curvature Opposite these is often seen a persistent wave on the greater curvature Of course, this contraction is not only of the greater, but is a complete contraction of the entire circular ring at the level of the ulcer The *x* ray picture, one often forgets, is only a shadow We could explain this indentation or contraction as an irritation of the conduction system mentioned above, and hence of a contraction at the level of the irritation Further with large ulcers on the lesser curva ture there is usually a marked disturbance in motility Residues of twenty four hours are not uncommon, and these can often be shown to be due not to a pylorospasm, for the pylorus may be abnormally relaxed This may be due to extensive destruc tion of the conduction system, and I think that these symptoms are most marked when the ulcer is at the cardia or re entrant angle, where nodal centers are probably present In contradis tinction may be mentioned the enormous lesions that often occur on the greater curvature of the body and fundus without any delay whatever in motility

With this in mind, what of operations along the lesser curva ture? Excision of ulcers so located was one of the early surgical procedures for the treatment of this condition but the results were notoriously bad and few surgeons, I think, now perform this operation It was followed by a marked disturbance in gastric motility This may have been due to the excision of a large part of the conduction system mentioned

above, and possibly of one of the nodal centers. Experimentally, I have seen that there is markedly weakened peristalsis beyond the level of the excision, but that there may be more vigorous peristalsis proximal to it. To overcome this difficulty a gastro-enterostomy was added and the stoma was placed, if possible, proximal to the level of the excision. Then better emptying occurred

One of the late operations for gastric ulcer, described, for instance, by Borchers, is a complete excision of the lesser curvature, or "Magenstrasse" No late reports are available, but certainly, if the above concept is true, there must be disturbances in motility after such an operation, unless the pylorus and a good part of the antrum are also excised Under the latter conditions the tone and contractions of the body and fundus could cause emptying. Borchers' early reports state that *x*-ray examinations of his patients showed marked weakening of the peristalsis and a residue.

Another operation often performed for ulcer is a sleeve resection. Here a complete circula segment is excised We shall not consider the organic defects that may result, such as hour-glass contracture. But this operation causes much less disturbance than the mere excision of a part of the lesser curvature A very curious phenomenon results. The antrum is freed of all muscular and nervous control from the body by the circular scar connecting the two at the suture line. The two parts of the stomach, the proximal and the distal, *i e*, the body and the antrum, now have independent waves, very much as the auricle and ventricle in complete heart block, and the antrum, since its muscle is of a lower rhythmicity than the body, has a slower rate of peristalsis than the latter Fair motility may nevertheless result, but any slight additional disturbance, as a contraction of the circular scar, may help to overthrow the accommodation that has been obtained. It is not necessarily the hour-glass that causes delay in emptying, for if in animals one makes an hour-glass by cutting across the greater and lateral curvatures and leaves only the lesser curvature with a little of the stomach on either side intact, there follows no delay in motility.

These are a few of the facts of gastric motion which may be explained by the above conception. Of course, new facts may necessitate change or abandonment of this hypothesis.

The experiments referred to above are part of a series performed in the Surgical Research Laboratories of the College of Physicians and Surgeons, Columbia University, New York City.

CHEMISM OF THE STOMACH AFTER OPERATION

DR. BURRILL B. CROHN

Successive years have seen successive changes in the technic and in the form of operation which has been performed upon the stomach for gastric and duodenal ulcers. Many of us have seen the transition of the forms of surgical interference from the original relatively simple gastro-enterostomy of Wölfler to the pyloroplasties, to the local excision of ulcer, to the transverse or so-called circular resection of part of the antrum or body, and finally to this last phase of gastric surgery, the partial or subtotal resection.

The last operation is one which has been fostered and advocated by its most enthusiastic proponents, among the latter being Von Haberer, Finsterer, and, in our own country, by A. A. Berg.

The clinical end-results of partial resection for ulcer are so satisfactory, in the majority of instances so final, and, in contrast to the series of operations previously cited, so much more acceptable in its final analysis, that it behooves us to investigate the factors which are influenced by such operations and to attempt to analyze what it is that the last advocated operation accomplishes more than do the others

From the standpoint of physiology there are two possible factors which may be influenced—one, the gastric motility; the other, gastric secretion. It is with the latter that we are most interested at this particular moment. The studies in the physiology and the pathology of the stomach after gastro-enterostomy have furnished us with much interesting data,

some of it rather surprising, concerning the changes which are brought about by this operation of anastomosis Presumably, the operation was devised with the intention of providing an accessory means of drainage for the stomach contents, a hastened emptying, and a lower acid secretion. It is currently thought that by allowing free regurgitation of intestinal contents of an alkaline reaction into the stomach that the acid of the chyme is materially reduced, thus providing a medium which encourages the healing of an ulcer and, by maintaining a permanent alkalinity, preventing a recurrence of the ulcer Unfortunately, such are not the facts and, unhappily, there is much data accumulated in the last few years which shows that in a large percentage of cases gastro-enterostomy neither hastens the emptying nor materially reduces the acidity of the gastric contents.

The free acidity after such an operation is usually somewhat, or materially, reduced, but in few cases where there have been moderate or large amounts of free acid before operation is an achlorhydria established after such a procedure. If one undertakes a fractional test-meal in such a case, one will see an absence of free acidity in the first one-quarter or one-half hour period, but thereafter there is usually seen an irregular rise of the free acid curve with a gradual fall after one and a half or two hours. The diminution of free acidity is quite obviously due to the regurgitation of bile and pancreatic contents from the jejunal loop. The total acid curve is often high and remains high; it may be somewhat lower than was the curve before operation, but not materially so Even where the clinical results are fairly good, one does not note greatly increased emptying time In a recent study of a small group of cases, comparing acidities before and after operation, Guy noted lower acid values and hastened motility in many of the fractional test-meals examined after gastro-enterostomy; the acidity values were lower for the gastric than for the duodenal ulcers.

Hunter carefully examined his postoperative cases in which gastro-enterostomy had been performed. In seven instances of duodenal ulcer in which no exclusion of the pylorus was

attempted he found the emptying time somewhat better, but the acidity values little affected, except in two instances, in which an achlorhydria had been brought about Of 13 cases of gastric (pyloric) ulcer the acidity values after gastro enterostomy were approximately the same after as before the operation, with the exception of 3 cases, in which anacidity was present after the surgical procedure (the acidities before operation were not given in this article)

In a series of cases examined by Wilensky and Crohn in 1916 it was noted that the average amount of the Ewald test meal was 113 8 c c after the gastro enterostomy operation, an amount which is concededly considerably above normal The average free acidity was 31 and the average total acidity 59 This group of cases consisted of patients who were clinically well and free of complaints In cases with functional disturbances after gastro enterostomy the amount of the Ewald test meal rose to 156 c c with 32 free, and 62 total acidity In cases with anatomic disturbances after operation the amount of the Ewald removal was 233 c c with 32 free and 57 total acidity These figures are amply confirmed by careful studies of Faulhaber and von Redwitz Hunter, and many other authors, and are convincing in demonstrating that whatever may have been expected of the operation of gastro enterostomy it does not effectually reduce the acidity of the stomach or improve its motility excepting, always and of course, those cases in which a cicatricial stenosis of the pylorus had previously been present

Regarding pyloroplasties we can quote very little in the way of figures Such data as may be culled from the literature tends to give one the impression that motility may be influenced by such an operation, the secretory activity of the stomach, however, is not modified in one way or the other

The operation of excision, of cautery excision, or triangular excision had and in many hands still has a constant usage The operation is practically reserved for ulcers situated in less accessible regions of the lesser curvature and duodenum, and may or may not be combined with the operation of gastro enterostomy

The article of Faulhaber and von Redwitz quotes 3 cases examined clinically some time after operation. In all 3 cases the acidity was as high, if not higher, after the operation than preceding operation. In their cases a gastro-enterostomy had not been performed. Their results were not good, neither clinically nor physiologically Thus, in one case in which the Ewald test-meal showed before operation 100 c.c. removed (free acid 42, total acidity 76), after operation the Ewald test showed practically 266 c c , with a free acidity of 35 and a total acidity of 60 Judging, therefore, the results of a local excision of an ulcer merely upon gastric acidity and secretion, one fails to see any beneficial result or any effect which might be interpreted as improvement in the exit time of the test-meal. Such has been truly the criticism of local excision, for it is very probable that interference with the nervous mechanism situated on the lesser curvature, as affected by local excision, is likely or liable definitely to affect the expulsive time of this viscus. Schur and Plashkes refer to the fact that resection of an ulcer without gastro-enterostomy does not reduce the acidity of the stomach after operation

The gastro-enterostomy was deliberately added to local excision to overcome what was discovered as a probable fault in the operation, but our own experience has been that, with or without the gastro-enterostomy, motility is influenced adversely and secretion either not affected or not materially reduced

Less than ten years ago there were still many ardent advocates of the operation of transverse or circular resection As recently as 1915 Faulhaber and von Redwitz published a series of 30 cases, and recommended the operation as a successful routine procedure for ulcers situated away from the pylorus The amount of tissue that was removed by the surgical resection, or sleeve resection, as it is sometimes called, varied in different cases, depending to a great extent upon the situation of the ulcer and upon its size The effect of the operation upon gastric secretion was an inconstant one. as judged by the following figures taken from their case reports·

	Before operation		*After operation*	
Case No	Free HCl	Total acidity	Free HCl	Total acidity
11	21	33	3	33
12	19	29	8	38
13	97	102	52	78
14	45	61	37	62
15	33	51	14	43
16	60	72	32	41
17	Strongly acid		16	34
18	41	74	Free HCl Pepsin positive	Negative
19	14	30	Negative	20
20	62	92	36	58
22	62	84	Negative	20
23	24	60	Negative	Pepsin positive
24	Not given		Negative Pepsin positive	16
25	44	60	Negative Pepsin positive	15
26	Not given		Negative Pepsin positive	13

From these data it is impossible to draw a single conclusion regarding the effect of circular resection upon gastric secretion The technic is presumably similar in all these cases, the sizes of the resected portion of the stomach vary though not markedly so The ulcer in each case was situated on the lesser curvature, sometimes higher sometimes lower Why it is that in some cases acidity persisted after resection, while in the last 5 cases an achloracidity resulted from the operation cannot be determined from the facts at hand

Gocke reports a fairly large series of cases of extensive resection of the stomach While most of his cases are reported as triangular excisions of ulcers the operation was so extensive as really to be classified as modified transverse or irregular sleeve resections involving the antrum and body of the viscus The poorest motility results are those in which he has removed a large triangular sector with the base of the triangle on the lesser curvature The results have been a dilatation of the sinus area along the greater curvature in the region of the sinus of Forssel, resulting in delayed motility and interference with

motor function in a fair percentage of the cases. It is, however, of interest to note that in 16 out of 19 cases of body resection an anacidity was produced His clinical results are nevertheless good, and recurrent ulceration is not recorded, presumably due to the anacidity which the operation produces

Hartel found no uniform effect of the operation upon motility, finding sometimes normal emptying time and at other times definitely delayed motility. Often there is definite and marked hastening of motility, which is so extreme as to prevent filling of the stomach in the roentgenographic examination. In other cases there is a definite hour-glass production as the cicatrix contracts, producing a constriction of the most undesirable kind Delayed motility in the upper segment of such a stomach is quite the rule. Subacidity is the usual result of the operation, though the author, being unable to explain why in some cases the acidity is not diminished, recommended that in all cases in which the hyperacidity exists a more complete operation of the type of partial resection (Billroth II) should be performed, since the latter guarantees a postoperative anacidity It is hardly the secretory results that have cast reflections upon the success or lack of success of sleeve resection operations It is more nearly true that the motor delays and artificial hour-glass contractions have caused surgeons to approach this procedure with much hesitation. If anacidity or achlorhydria be a desideratum to be accomplished for the cure of ulcer, if one lends himself at all to the belief that ulcer thrives in an acid medium or is in any way affected by a high acidity, or if you will only agree that peptic ulcers heal better and more permanently in the presence of an achlorhydria, then one must show preference as a matter of choice for the operation of partial resection Such an operation removes from the stomach all of the distal third, including the pylorus, and including also the first portion of the duodenum. The line of resection, according to the best technic, lies above the incisura angularis, that indenture on the lesser curvature which roughly marks off the digestory from the egestory chambers of the viscus Removal of the pylorus and the first portion of the duodenum is essentially a part of the

operation and is followed by an anastomosis between either the cut surface of the duodenum or with a loop of the jejunum

A careful examination of the gastric contents by means of both Ewald and fractional test meals of a large series of cases operated upon in this institution and followed up for the last one to five years has furnished ample data upon which to formulate an opinion (Lewisohn) In 10 cases in which a Billroth I or a Billroth II had been performed Lewisohn found a complete achlorhydria after operation in 6 of the cases and so marked a diminution of free and total acidity in the remaining 4 that these latter almost bordered on anacidity The reduction of acidity after the removal of the antrum amounted to the eradication of from 60 to 80 per cent of the total gastric secretion and in the remaining cases of 100 per cent of the preoperative secretion It is our experience, that where only the pylorus is removed acidity is completely retained Where pylorus and part of the antrum are removed the gastric acidity is in no way affected Experience has also shown that in every operation in which the entire antrum, including the incisura angularis is resected completely, achlorhydria, if not achylia, results Thus, Schur and Plashkes report the chemism of 6 clinical cases of resection of the pylorus and antrum for ulcer In 5 of these 6 cases complete anacidity and in some cases achylia (absence of digestive ferments) resulted In 5 of these 6 cases the motility was rapid so that slight if any, residue was found by the Ewald test meal up to one hour Experimentally Dagaew performed the Kocher Billroth I or Billroth II operations upon 6 dogs and found complete anacidity in all of them after the resection This is all the more surprising if one stops for a moment to consider the histology of the gastric mucous membrane for the acid and pepsin producing cells are not removed by the operation It will be seen that these secretory acini reside not in the resected portion but in the fundus and body portions which remain This paradoxic situation is all the more interesting in so far as histologic examination of the remaining body and fundus usually reveals perfectly intact cells in a good state of preservation Why these surviving cells, anatomically perfect,

should suddenly physiologically cease to function is a question which should interest the experimental workers.

It seems that it is only when the incisura area is resected with the antrum that this artificial achylia results. In most instances not only an absence of free acid and a low total acidity is produced, but there is also an absence of pepsin and even in most of the cases of the ferment rennin. Nor is this experience unique in our hands, for the previously cited article of Faulhaber and von Redwitz shows them to have had the same experience in 3 cases examined after operation Moreover, it is likely that the discrepancies and inconsistencies in the secretory results after sleeve resection, as noted by the above authors, is due to the fact that in some cases their sleeve resection included the incisura area and in other cases it did not

It is only with difficulty that one can explain such results on the theory of Edkins, the theory of the production of the gastric hormone in the antrum of the pylorus, a hormone which causes the secondary gastric stimulation The latter theory of the hormone control of gastric secretion has been so much attacked and criticized of late as to create much doubt as to its authenticity. Our observation of the necessity of including the incisura area in such a resection in order to produce an achylia would lead to the inference that there is a nervous center of control in this segment, in the absence of which the remaining tissue, though containing functionally and anatomically active cells, fails to produce a normal or acid secretion

It would seem that the highly satisfactory results of this operation of partial resection for gastric ulcer are to a great extent dependent upon the anacid condition which it produces. For, where in the early operations, including gastro-enterostomy, we were prone to meet with a large percentage of recurrent and of gastrojejunal ulcers, in this series of resected cases we have yet to see a first postoperative peptic ulcer or a recurrence of the original ulcer near the site of the incision.

The general literature seems to include 1 or 2 cases in which a peptic ulcer occurred after the operation of partial resection. Such unusual occurrences are the exception that prove the rule.

In addition, it may be stated that the motor function of the stomach is well preserved after partial or even subtotal resection, the filling mechanism being analogous to that of the normal stomach, and motility hastened

The only abnormality noted is occasionally an insufficiency of the sphincter at the cardia, with a slight dilatation of the lower portion of the esophagus leading to the occasional complaint of substernal oppression and belching after eating This, however, is a very mild symptom and is practically the only one with which we meet in even a fairly large series of operated cases

It does not seem that the functional results of the Billroth I operation are as satisfactory as those in which a more complete or subtotal gastrectomy is performed The Billroth I operation, in which a gastroduodenostomy furnishes the means of anastomosis, is usually reserved for cases in which the ulceration has been less extensive In these cases the acid gastric secretion is usually preserved, in a recent case the acid titer after operation ran up to almost 100 per cent for total acid, the radiographic examination showed a recurrence of the ulcer at the site of anastomosis and severe clinical symptoms Gocke reports a case of pylorectomy and partial antrumectomy in which following operation (Billroth I anastomosis) the total acidity rose to 100 per cent, higher even than the acid titer before operation Finsterer, in criticizing such operations in which the pylorus and only part of the antrum are removed (von Eiselsberg's operation and some of von Haberer's followers), cites several cases of Billroth I operation in which recurrence of ulcer occurred Finsterer remarks that in no case in which achylia had been produced has he noted the recurrence of postoperative ulceration For his own operation the "resection zur Ausschaltung," a procedure in which the antrum and a very large part of the body of the stomach (up to one half to three fourths of the viscus) are removed with preservation of the duodenum and pylorus, he claims splendid results presumably due to the fact that an artificial achylia is produced, preventing further ulceration

BIBLIOGRAPHY

Dagaew: Mitthel aus d Grenzgeb Med u Chir., 1913, xxvi, 176.
Finsterer: Arch. Klin Chir., 1922, cxx, 111
Gocke Beitr. zur Klin Chir, 1916, xcix, 294
Guy. Brit. Jour Surg, 1923, x, 403
Wilensky and Crohn, Faulhaber and von Redwitz Mitth aus d Grenzgeb Med. u Chir, 1915, xxviii, 150
Hartel· Arch Klin Chir, 1911, xcvi
Hunter· Quart Jour Med, 1923, xvi, 95.
Lewisohn Resection of Stomach for Chronic Gastric and Duodenal Ulcer
Schur and Plashkes Mitthel. aus d Grenzgeb Med u Chir, 1914-15, xxviii, 795.

DR. A A BERG: The numerous recurrences of ulceration in the stomach and duodenum, following upon the various operations that are performed for the radical cure of gastric and duodenal ulcer, make us question whether these operative procedures are really radically curative of the condition.

Every surgeon knows of gastrojejunal ulcer following upon gastro-enterostomy The difference of opinion among surgeons as to the frequency of recurrences of ulceration in the stomach or duodenum, or the appearance of a new ulceration at the gastrojejunal stoma or in the jejunum, is due to the fact that the patients who have been operated upon have not been followed for a sufficiently long time, or that we have been careless in the conduct of the follow-up system.

In a recent discussion on this subject in a neighboring city, a surgeon told me that he had not known of a recurrence of duodenal ulcer after gastro-enterostomy, and that he had never experienced or known a gastrojejunal ulcer to form after gastro-enterostomy There happened to be an internist sitting in the room, who had referred 2 patients to this surgeon for operative treatment of a duodenal ulcer He said to this surgeon, "I cannot quite agree with that The 2 patients I referred to you have the same symptoms now that they had before the operation The reason I said nothing to you about these patients was because I was under the impression that nothing could be done to relieve them of their severe suffering." This surgeon, then, had 2 patients with recurrence of symptoms after a gastro-enterostomy performed several years before.

In our own series of cases we have had 30 per cent of recurrent symptoms after gastro enterostomy or one of the other operations performed for the radical cure of gastric or duodenal ulcer By far the largest proportion of these recurrent symptoms was due to a formation of a gastrojejunal or jejunal ulcer Patients presenting these recurrent symptoms seek first of all, the advice of the surgeon who has operated upon them He in turn refers them to the internist for medical and dietetic treatment Can the latter who sees these patients with recurrent symptoms in his daily rounds in the hospital and in his office practice, be blamed for his growing lack of confidence in the efforts of the surgeon to bring about a radical cure by one or other of the operations that have heretofore been performed He sees them suffering as they did before the operation And it is these patients with recurrent symptoms—whether due to recurrence of the gastric or duodenal ulcer or to the formation of a gastrojejunal or jejunal ulcer—that have made the internist doubt the efficacy of operation as a means of radical cure for gastric and duodenal ulcer

The surgeon will never be able to convince the medical man that indurated ulcer of the stomach and duodenum is a surgical disease until he is able to demonstrate a lasting and permanent cure from operation The operation of gastro enterostomy is the operation most commonly resorted to for the radical cure of a gastric or duodenal ulcer Less frequently employed are the operations of pyloroplasty, with or without gastro enterostomy cautery excision of the ulcer, simple excision of the ulcer, with or without gastro enterostomy and sleeve resection of the stomach It is claimed that the recurrences of gastric or duodenal ulcer or the new formation of gastro jejunal and jejunal ulcers are most common after the operation of gastro enterostomy In our own statistics we have found, out of 100 cases of duodenal ulcer treated by gastro enterostomy, 50 per cent were cured completely through a period of observation of ten years, about 22 per cent presented mild recurrent symptoms and the remainder were suffering as severely as they did before Of these last the new formation of a gastro-

jejunal ulcer was the most common cause of the recurrent symptoms. Only in a few were the recurrent symptoms due to the reopening or persistence of the original duodenal ulcer.

Our results after simple excision, whether or not combined with gastro-enterostomy, were very little better than with gastro-enterostomy. We have not had as many cases of simple excision, with or without gastro-enterostomy, as we have had of gastro-enterostomy alone, and yet the occurrence of renewed symptoms seems to be just as frequent as in the first class of patients

The late disturbances in motility following sleeve resection, the anatomic deformities of the stomach, such as hour-glass contraction, frequently attendant upon this operation, have caused us to give up this method of operation as a means of radical cure of gastric ulcer These anatomic deformities and disturbances of motility are not the only objections to sleeve resection, for in several of our patients we have noticed the reformation of ulceration on the lesser curvature after sleeve resection

These very unsatisfactory results of ours are not unique. We find records in the literature, especially in the German literature, of unsatisfactory results following gastro-enterostomy, excision, and sleeve resection for the radical cure of gastric and duodenal ulcer In one German clinic the proportion of recurrent symptoms has been even higher than 30 per cent. It is important to remember that in following up our cases after operation for gastric and duodenal ulcer we do not rely too much upon written reports from these patients It is not at all uncommon for us to have patients come to the follow-up clinic complaining only moderately of recurrent symptoms, patients from whose written report we would be likely to put into a group composed of those not entirely cured and yet not suffering severely enough to warrant their being put into the class of failure Such patients on examination are often found to have gastrojejunal ulcer One such patient, I remember, had a gastrojejunal colonic ulcer. Some patients will state that they feel entirely well, yet examination

reveals the existence of gastrojejunal ulcer or renewed ulcer in the stomach and duodenum The point that I wish to make is that, if we follow the patients who have been operated upon for a period of five to ten years we shall be surprised to find that a considerable proportion of them—in our own statistics up to 30 per cent—present symptoms of renewed or newly formed ulcerations In other words the surgeon has failed to bring about a lasting cure in a considerable number of the patients operated upon

Inasmuch as the internist also fails to bring about a cure by medical and dietetic measures in a considerable proportion of patients the question arises What is to be done for the lasting cure of this disease? Are we to continue these old operations, or are we, as progressive men to look around and search for other measures and other procedures to bring about a lasting and permanent cure? Only when we can show the internist that our operative procedures in the large proportion of patients are likely to be followed by a permanent cure can we expect him to employ operative measures in those cases that have not yielded to his internal and dietetic measures

We have found by experience that the removal of the antrum of the stomach, pylorus, and first part of the duodenum is followed by such a lasting and permanent cure Most surgeons have done partial or subtotal gastrectomy for the cure of gastric and duodenal ulcer in isolated cases for a great many years and I am sure that those who go over the records of these cases will find very few patients who present renewed or recurrent symptoms of ulceration

Within recent years it was recommended that such removal of the antrum pylorus, and first portion of the duodenum be the regular procedure in the radical cure of gastric and duodenal ulcer One of the earliest advocates of such a radical operation was von Haberer He reported excellent results following the removal of the antrum pylorus and adjoining portion of the duodenum, with anastomosis of the duodenum into the lower angle of the cut end of the stomach, in other words partial gastrectomy with gastroduodenostomy The mortality following

the operation in his hands was comparatively low. His first figures were approximately 7 to 8 per cent., and this has been reduced to 5 per cent. The postoperative inspection of these patients has shown recurrence of ulcer in but 1 or 2 cases, though hundreds of patients were operated upon. Other surgeons in Germany, one in England, several in Austria followed the lead of von Haberer and adopted this procedure of partial or subtotal gastrectomy, either with gastroduodenostomy or gastrojejunostomy, for effecting a radical cure of gastric and duodenal ulcer.

In our own clinic for the past two and a half years, we have adopted the operation of partial or subtotal gastrectomy with gastrojejunostomy as the operation of choice for the radical cure of gastric and duodenal ulcer. In this time we have performed about 150 operations, our mortality has been between 8 and 9 per cent , and we have thus far had no instance of recurrent ulcer. We have adopted this procedure as the operation of choice. We have not selected our cases. We have taken patients suffering with pulmonary lesions, such as tuberculosis, advanced emphysema, or with cardiac lesions, patients exhausted and anemic, weakened by loss of blood, emaciated from inanition, and yet, in these unselected cases, the mortality following partial or subtotal gastrectomy has not been materially higher than it would have been in a similar group of unselected cases in which the simpler operations, such as gastro-enterostomy, or excision with or without gastro-enterostomy, were performed

The question of mortality is an important one. The operation that is to be performed in a patient must not be attended with too grave a risk, if we are to expect the patient to submit and accept the method of cure that we prescribe. In our own hands gastro-enterostomy has been attended with a mortality of about 3 per cent. Of the patients who survived gastro-enterostomy, however, 30 per cent. have recurrent symptoms, due either to renewed ulceration or to gastrojejunal ulcer or jejunal ulcer, lesions that required reoperation Secondary operations in these patients have been attended with a mortality of 15 per cent. This 15 per cent. is properly a mortality that should be added to the mortality of gastro-enterostomy, for

the patient has come to us to be cured of his disease. If two operations have been necessary to cure him, the mortality of both operations should be considered under one head. This combined mortality is to be compared with the mortality of partial gastrectomy, and a slight computation will readily convince you that such combined mortality of the primary and secondary operations is materially higher than is that attendant upon the operation of partial or subtotal gastrectomy.

It is not sufficient to relieve a patient of his symptoms for one year or two years. It is not proper for a surgeon to content himself with the thought that he has brought about a cure for one, two, or three years. The affected individual has sought his aid for lasting cure, and the results of the operations that are undertaken for his lasting cure are surely to be considered under one head and contrasted with the operation that brings about a lasting cure in one operation, not in two, three, or more operations scattered over as many years.

The mortality of 8 per cent. can be materially reduced. If we select for partial or subtotal gastrectomy such patients as are really fit to undergo this procedure the mortality following this operation will be at once reduced to about 5 per cent. I am convinced that with increasing experience in the performance of this operation, with added knowledge of how to approach the difficult ulcers that penetrate into the substance of the head of the pancreas, with further information as how to avoid complications such as acute pancreatitis, the mortality following partial gastrectomy will shortly be no more than that following gastro-enterostomy. Those of us who now have but 3 per cent. mortality following gastro-enterostomy will remember when the mortality following this operation was considerably higher than 10 per cent.

If the operation, then, of partial or subtotal gastrectomy may be performed with no greater danger to the patient than gastro-enterostomy, and if the results of partial or subtotal gastrectomy are almost certain to be a radical and lasting cure of the ulceration, there can be no doubt which operation we are to select as a radical permanent cure of gastric and duodenal

ulcer. Objection is raised by some internists to the operation of partial or subtotal gastrectomy because it disturbs the physiology of the stomach and the physiology of gastric digestion. It is true that most of these patients who have been subjected to subtotal or partial gastrectomy are completely anacid as to their gastric secretion. A few have a very slight amount of acid in their gastric juice The motor functions of the remaining portion of the stomach are not at all disturbed or interfered with by the operation of partial or subtotal gastrectomy. It is claimed that this disturbance in the physiology of gastric secretion leads to pernicious anemia In our own clinic we have, as I said before, been doing this operation for a number of years, and yet we have still to see a patient who developed a pernicious anemia following upon this operation. Patients with carcinoma of the stomach have survived a subtotal and partial gastrectomy for quite a number of years I have a patient living after twenty years. The patient is entirely anacid, but there has been no pernicious anemia One of our patients operated upon for ulcer was a syphilitic In spite of antisyphilitic treatment this patient has gone on to develop a pernicious anemia. It is not fair to assume that the pernicious anemia was due to the gastric operation Much more likely is it dependent upon the syphilitic condition.

After a patient has had a gastro-enterostomy or one of the other types of, what I call, palliative operations performed for the relief of gastric and duodenal ulcer, it has been our practice, similar to that of other surgeons and internists, to recommend that a rather rigid diet be followed. It is not always easy to convince the patient or persuade the individual to follow such a diet, and when recurrent symptoms take place we are inclined to consider the recurrence as due to indiscretions in diet I have always been inclined to look upon such an excuse as a lame one, and have always considered such recurrences as evidence of our failure to bring about a lasting cure. One eminent surgeon recently remarked that patients who have suffered with gastric and duodenal ulcer and have been operated upon should not only observe a strict diet, but should

either dine at home or when they go out to dine should carry their food with them It is hardly fair to ask a patient who has been operated upon to consider himself an invalid for the rest of his life! I feel that if the individual knew, prior to the operation, that he had to live for the rest of his existence upon a restricted and carefully regulated diet, he would not be apt to submit to operative procedure

At all events, after partial and subtotal gastrectomy, we do not require patients to observe strict dietary measures We encourage them to eat as normal individuals A short while ago a patient upon whom I had performed a subtotal gastrectomy for ulcer asked me to dine with him I noticed during the dinner that he ate everything on the bill of fare, from soup to nuts I said, "My dear fellow, you have just been operated upon for ulcer and the greater part of your stomach is out" "That is just it," he replied, "that is why I can eat everything"

Last Sunday morning in the hospital we went over a large group of patients upon whom a partial or subtotal gastrectomy had been performed and, in spite of liberal diet, we saw no recurrent symptoms Surely this ease of digestion, this free and easy evacuation of the stomach after partial and subtotal gastrectomy, this freedom from recurrent symptoms leaves very little doubt in the minds of those who are concerned with the radical cure of gastric and duodenal ulcer as to what is the proper procedure to employ As I said before, I am given to consider gastro-enterostomy, excision with or without gastro enterostomy, sleeve resections, pyloroplasties, etc, as palliative procedures, and that radical cures are to be brought about only by the removal of the antrum of the stomach, pylorus, and first part of the duodenum

In the examination of the patients last referred to, we asked, "How do you feel?" "Perfectly well," they answered We put the cardinal questions to which we subject everyone of our operative patients "Can you eat everything?' "Can you do a day's work?" "Do your bowels function?" In each instance an affirmative answer was the result Patients who can attend to their daily work, who enjoy their food as it is

presented to them, who have a normal bowel function, maintain their weight, and retain their interest in life, may be considered as cured. Before I practised partial or subtotal gastrectomy for the radical cure of gastric and duodenal ulcer, when I resorted to what I term the "palliative operations," I was afraid to go through the medical wards, because each time I did so I found there the evidences of my failure to bring about a radical cure I would see these patients with recurrent symptoms to whom the medical man would point, saying, "These are the results of your operative procedures! If the ulcerations recur after operation as often as these patients seem to prove, we can do just as well by internal and dietetic measures!" Since I have performed partial gastrectomy for the cure of gastric and duodenal ulcers, I can visit the medical ward with pleasure, for I see no patient with recurrenct or gastrojejunal ulcer.

We must wait, of course, for time to tell whether these results will be as good as they appear to be at the present moment We are enthusiastic We cannot deny it. At the present moment we look upon subtotal and partial gastrectomy as the method for bringing about the radical cure of ulcer. We may find, as time goes on, that this operation does not afford all that it at present promises. We shall then have to change our views which, as progressive American citizens, we have a right to do. But, at the present time, we have in partial and subtotal gastrectomy a procedure that is attended with less mortality than gastro-enterostomy and the subsequent operations for recurrent gastrojejunal and jejunal ulcers. We have in this procedure an operation which affords a cure, without observing dietary regulations, which is followed by no severe pathologic conditions, such as pernicious anemia, and the one procedure which holds out to the patient a permanent and lasting cure of his condition.

The patient upon whom we are going to operate today is a young man of twenty-six. He has been in and out of this hospital for the past four years. During this time he has had five or six attacks The attacks consisted of epigastric pain, especially marked upon taking food, pain relieved by medication

and rest in hospital He has a high acid content in his gastric juices *x* Ray examination shows an irregularity of the duodenal bulb, a marked six hour residue and what appears to be a diverticulum in the first portion of the duodenum The diagnosis, resting upon the history of recurrent attacks of epigastric pain in relation to food hyperacidity, and heart burn high acid content to the gastric juice, and the positive *x* ray findings of irregularity of the duodenal bulb, the marked six hour residue in the stomach, seems to be a positive one of duodenal ulcer, with moderate pyloric stenosis The duodenal diverticulum is a rather common finding in connection with duodenal ulceration It has been overlooked by a great many internists and pathologists

In the first place as regards the anesthetic that is to be used, it is the preference in this clinic to operate upon patients with gastric lesions under local anesthesia The local anesthetic is ½ per cent novocain with a very few drops of adrenalin added to it The amount of the local anesthetic that may be used in any particular case is unlimited We never take notice of the amount of local anesthetic we inject, for novocain in this dilution is practically harmless in any amount One half hour before the operation the patient is given 1/6 grain of morphin, with or without atropin Some time ago we gave what is termed a "secondary injection" of morphin just at the time of operation, but we have had unpleasant results following such secondary injections of morphin and have therefore discontinued this practice We never use scopolamin because of its marked depressing action

This local anesthetic is infiltrated along the line of incision, and secondary injections are made along the free borders of the ribs, the needle penetrating parallel to the skin and being pushed forward to the posterior rectus sheath We also infiltrate the last dorsal nerves as they emerge from the intercostal spaces at the free margin of the ribs In this manner, both by the injection in the line of incision and by the infiltration of the nerve-trunks and of the posterior rectus sheath, we achieve a complete anesthesia of the abdominal wall We

have never availed ourselves of paravertebral or spinal anesthesia. The paravertebral injections are entirely too uncertain in their action to be used as a constant practice, and a high dorsal spinal anesthesia is likely to be followed by too much depressing action

The advantages of a local anesthetic for the performance of major operations in the upper part of the abdomen are very great It is a well-known clinical fact that operations in the upper part of the abdomen are very likely to be followed by postoperative pneumonia. Such pneumonia is probably due to a paresis of the diaphragm which, in turn, is followed by an atelectasis and congestion of the bases of both lungs. In New York City postoperative pneumonia is a very serious complication We do occasionally find postoperative pneumonia follow upon operations in the upper portions of the abdomen, after the use of local anesthesia, but we do not find it to be as severe or as fatal as after the use of a general anesthesia, no matter what the nature of the latter may be

Most individuals are perfectly willing to undergo the pain and mental suffering attendant upon operations when done under local anesthesia, provided they are told that the local anesthetic has marked advantages over the general anesthetic. There are, of course, instances of hypersensitive patients or very neurotic patients who will not permit even the slightest operation under a local anesthetic In such individuals we must resort to a general anesthetic and, of these latter, laughing-gas with oxygen is to be preferred to ether or chloroform.

You will find that patients who are to be operated upon under local anesthesia are apt to be far more tolerant if the operating-room is quiet than if there are many visitors present or much noise in the operating theater. We will use a general anesthetic in this patient for your benefit I do not know how tolerant a patient this man is. If he is intolerant, his exclamations might disturb the clinic and prevent some of you from hearing what I have to say. But, in the usual course of our operations, we should have relied entirely upon the use of local anesthesia.

Operating —A median incision is made from just below the ensiform cartilage to the umbilicus The abdominal cavity is opened and the small bleeding vessels on the properitoneal fat are caught and ligated The stomach presents in the wound It is grasped with a piece of gauze and gently drawn outside the abdominal cavity the assistant aiding the exposure by slow and steady retraction of the edges of the abdominal incision This retraction is an important point If it is roughly executed it causes pain and pain at the beginning of an operation under local anesthesia is to be avoided for the patient loses his grit and further manipulations are rendered difficult With such slow and steady retraction of the edges of the wound the stomach the antrum the pylorus and the first part of the duodenum are slowly and gradually exposed to view and to palpation

In this individual we find on the anterior wall of the duodenum an indurated ulcer about the size of a 10 cent piece reaching from the superior wall of the duodenal angle across the anterior surface of the duodenum The peritoneum covering it is scarred and the duodenum is adherent to the under surface of the liver and the gall bladder In the center of this ulcerated area is a deep crater There are no evidences of fresh, localized peritonitis The ulcerated area is not edematous There is no fibrin covering the ulcer The adhesions around the ulcer are organized and not fresh In other words this man is in the quiescent period of his ulcer and the gross appearances of the ulcer and the parts adjacent to it are similar to those we find in a diseased appendix when we remove it in an interval between attacks If this patient were in an acute period of his ulcer, the wall of the duodenum would be acutely swollen and edematous There would likely be some fresh adhesions around the ulcer possibly even some fibrin covering its surface Such lesions are similar to those which we find in an acutely inflamed appendix I have maintained that this similarity between the lesions in the quiescent period and in the acute active period of ulcer and the appendix entitles us to the conclusion that it is the bacterial action in ulcers of the

stomach and duodenum which brings about the active period. It is such bacterial action which has led me to the conclusion that ulcers of the duodenum are preferably operated in the quiescent period just as a diseased appendix is by preference removed in the interval between two acute attacks.

This patient, then, has an ulcer of the first part of the duodenum, in the quiescent period The ulcer is located on the posterior and anterior wall and for its radical cure we are about

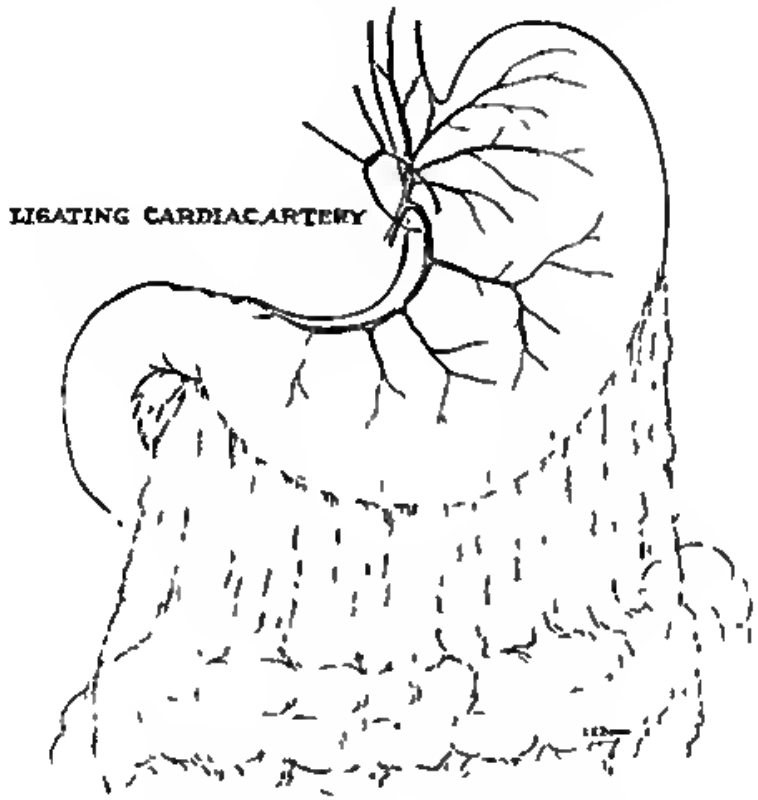

Fig 28

to perform a partial gastrectomy. I dare say that some of you will wonder why I remove so much healthy stomach for a comparatively small ulcer in the duodenum. My answer is, "Since when is the size of the lesion the criterion of its virulency?" Small ulcers are known to cause fatal hemorrhages. Small ulcers perforate. Small ulcers within a very few hours can become very large. In other words, it is not the size of the ulcer for which we operate, it is the ulceration of the stomach which we desire radically to remove, and it is our opinion at the present

time that such radical removal can be accomplished only by subtotal or partial gastrectomy

The first step in the performance of a partial gastrectomy is for the operator to penetrate through the gastrohepatic omentum into the retrogastric space. Such penetration is made at the point at which we intend to ligate the cardiac artery This point of election is just proximal to what I have called the reentrant angle of the stomach, that is, the angle between the

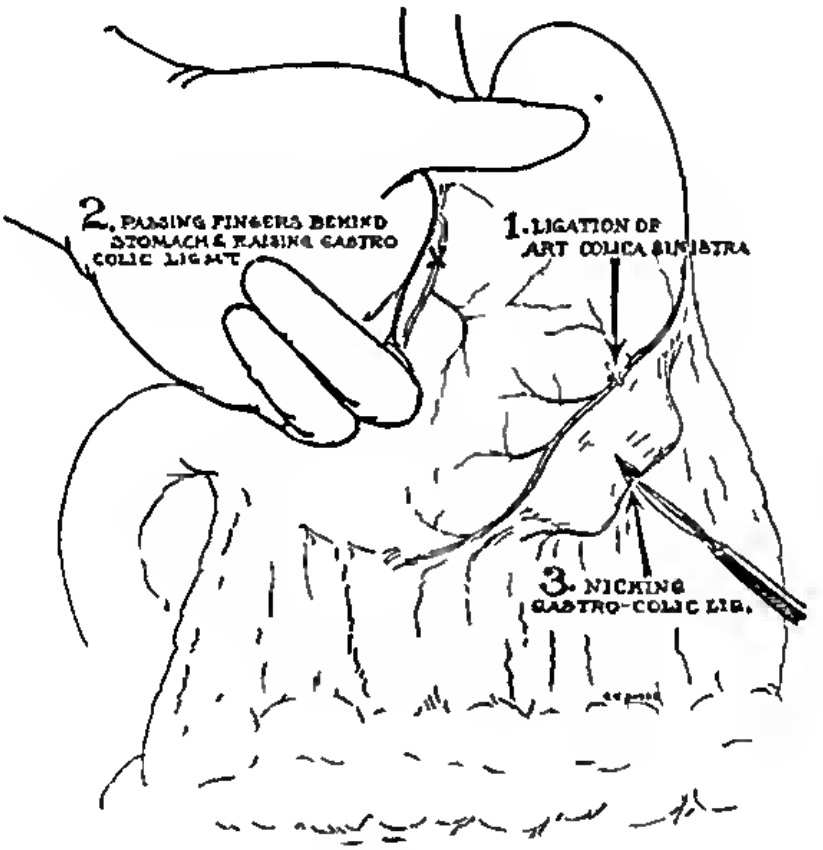

Fig 29

vertical and the horizontal limbs of the lesser curvature. As the index-finger penetrates into the retrogastric space the cardiac artery rests upon it. It is readily seen and may be palpated. A catgut suture or linen thread suture is at once passed around it. This is the first artery to be ligated. The index-finger now continues behind the stomach and pushes forward the upper layer of the gastrocolic ligament at a point directly opposite that at which the cardiac artery was tied.

At the point of election, namely, opposite the point at which the cardiac artery was tied, the left epiploic artery is seized between two clamps, divided, and at once ligated. This is the second artery to be tied

Putting the finger behind the stomach, the adhesions between the posterior surface of the stomach and the upper layer of the transverse mesocolon are separated. Here we come to an important point, viz., to be sure that the transverse mesocolon is

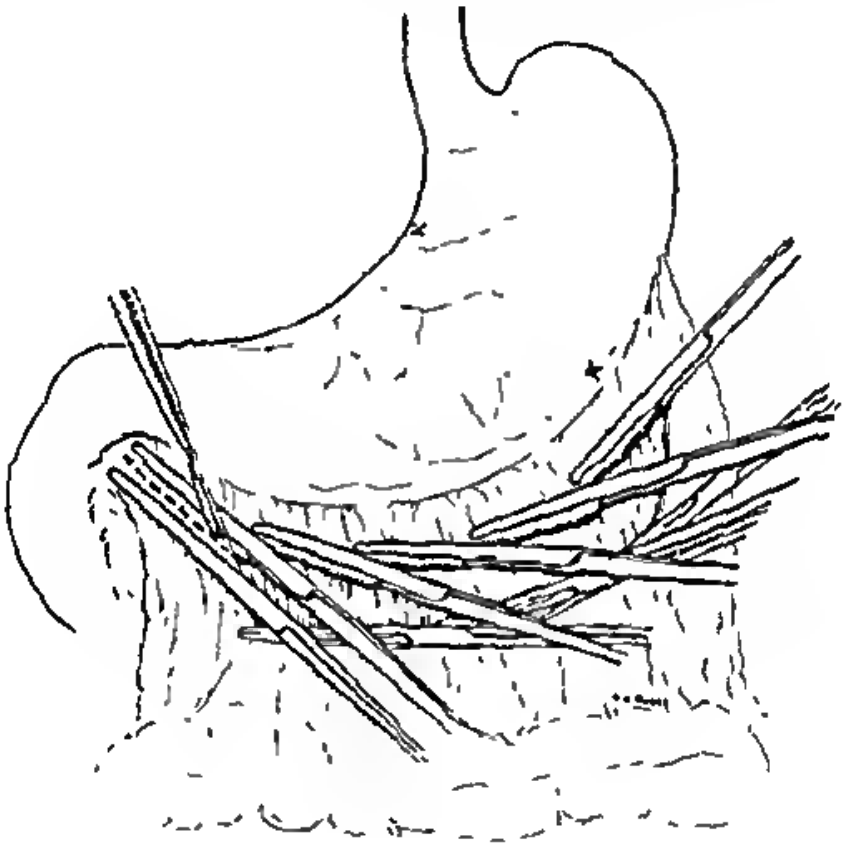

Fig 30

separated from the posterior wall of the stomach, for in the transverse mesocolon there runs the middle colic artery which supplies the transverse colon and splenic flexure, and ligation of the middle colic artery is usually followed hy gangrene of the transverse colon. Unless the posterior wall of the stomach is freely separated from the transverse mesocolon there is danger of including the middle colonic artery in one of the clamps or ligatures So one must be especially careful *that the posterior*

surface of the stomach is thoroughly freed from the upper layer of the transverse mesocolon.

When the posterior stomach is completely freed from this transverse mesocolon, the gastrocolic ligament is caught in sections between clamps and divided.

As we approach the duodenal colonic angle we divide the layer of peritoneum which bridges between the hepatic flexure of the colon and the anterior surface of the duodenum. This

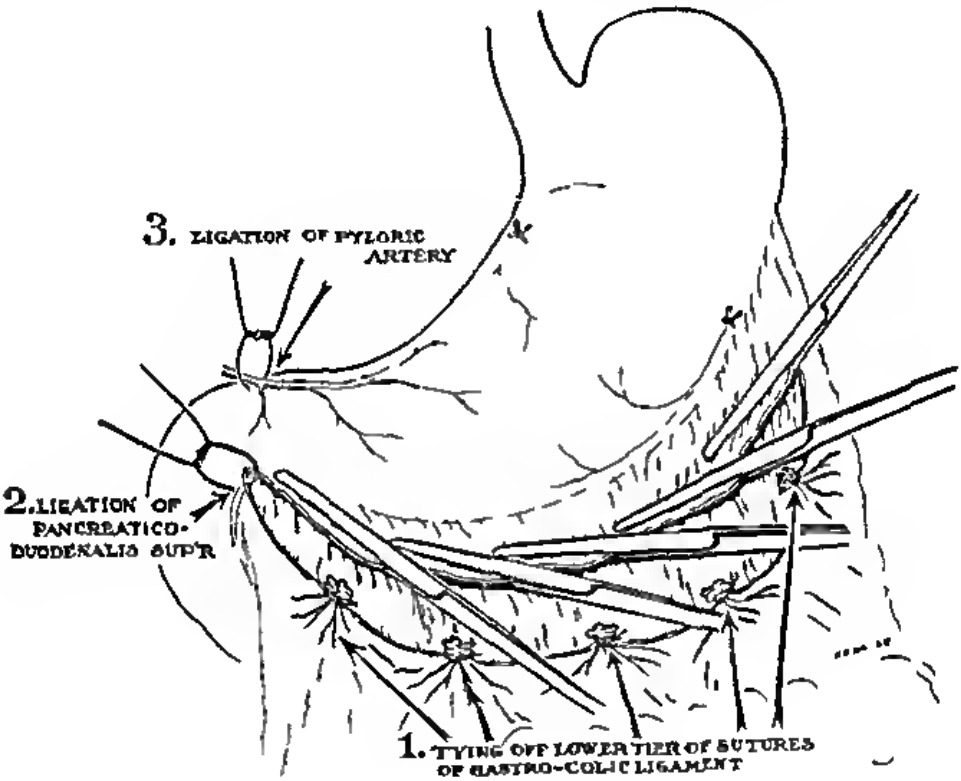

Fig 31

enables us to push the hepatic flexure of the colon away from the duodenum, thereby giving access to the duodenal branch of the pancreatoduodenal artery, which is again caught by clamp and deligated; the third artery that supplies the stomach and duodenum. The gastrohepatic ligament is caught between clamps until we approach the angle of the duodenum, where the pyloric branch of the hepatic artery branches over to the duodenum This is caught and tied—the fourth artery. The

entire blood-supply of the stomach and first portion of the duodenum has thus been caught between clamps, divided, and tied, and the stomach, antrum, pylorus, and first portion of the duodenum are ready for removal.

About ¾ inch proximally to the point at which we have ligated the epiploic and cardiac arteries we apply a long, straight clamp. About 2 inches distal to this clamp we apply a second long straight clamp, parallel to the first clamp We now extraperitonealize the portion of the stomach and duodenum by

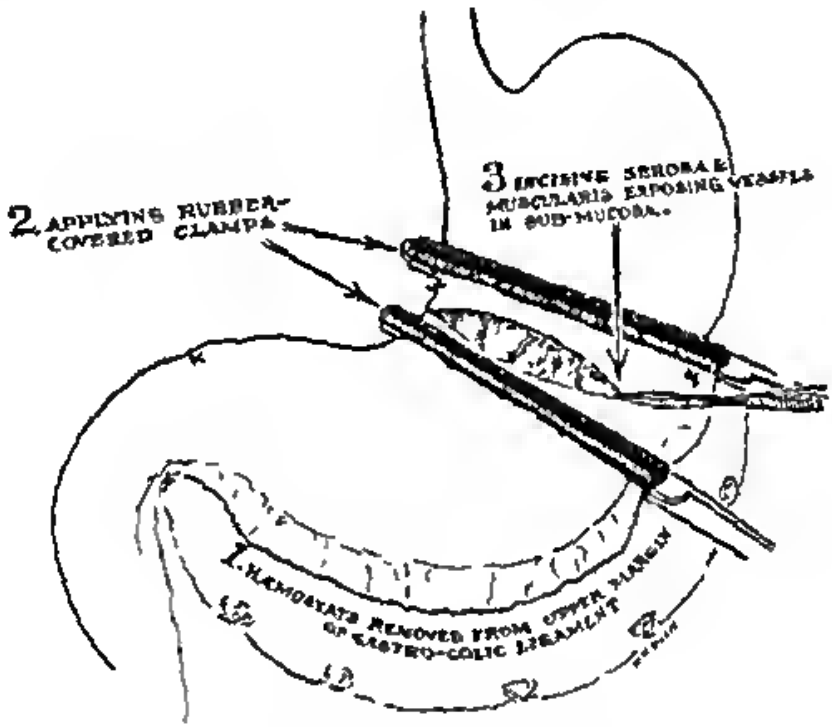

Fig 32

pads surrounded by aseptic towels. Especially is it important to put a pad behind the stomach, so as to prevent soiling with gastric contents. The stomach is divided between the two clamps.

First of all, the incision is carried through the serosa and muscularis of the anterior wall, exposing the vessels in the submucosa. These vessels are caught with clamps. They are the intrinsic vessels of the gastric wall Upon the care with which these vessels are caught and tied will depend the freedom from postoperative bleeding. I cannot too strongly dwell

upon the importance of avoiding postoperative bleeding. Bleeding into the lumen of the stomach, besides depriving the patient of very necessary blood, renders it necessary to pass a stomach-tube, and the passage of a stomach-tube through the aurophary nx with the scraping of its mucous membrane and dryness that follows upon such passage of the stomach-tube are additional factors in the production of a postoperative pneumonia. To such a pneumonia, of course, the weakened condition of the patient from loss of blood is very favorable When these

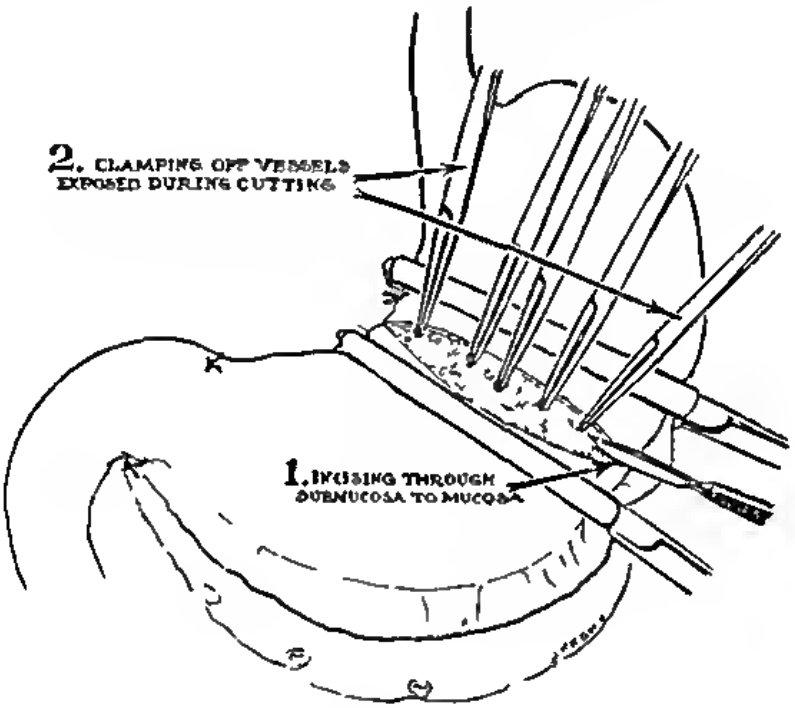

Fig 33.

small vessels have been seized with clamps the mucous membrane is divided on a level with the incision through the peritoneum and muscularis. The lumen of the proximal segment of the stomach beyond the clamp is thoroughly and vigorously cleansed with gauze. I think that such vigorous cleansing with a tampon of gauze makes the field practically sterile.

After the anterior wall has been divided the mucous membrane on the posterior wall is cut through, thus exposing the vessels in the submucosa. These are caught in clamps and then the peritoneum on the posterior wall of the stomach is divided

on a level with the incision through the mucous membrane. The cut edge of the proximal segment of the stomach is at once covered with iodoform gauze and turned to the left, the iodoform gauze, in turn, covered with a protecting pad or towel. The distal segment of the stomach is likewise covered with iodoform gauze and a pad, and this segment is reflected to the right. By retracting this distal segment to the right the posterior wall of the pylorus and duodenum is exposed, covered by the peritoneum which bridges from the head of the pancreas

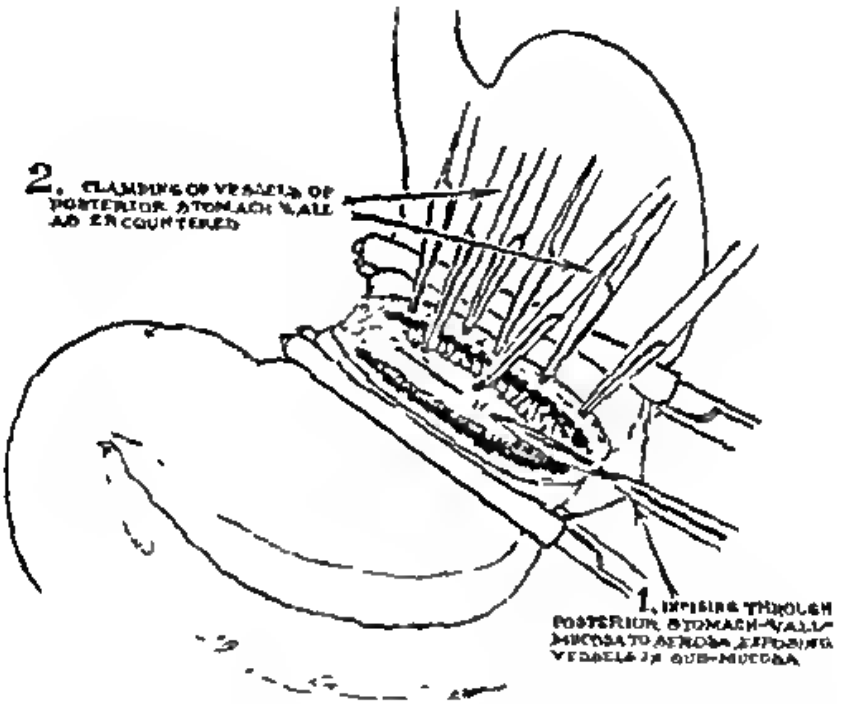

Fig 31

onto the posterior surface of the duodenum Beneath this peritoneum there run the small branches of the pancreatoduodenal artery, as the latter courses upward along the head of the pancreas. This peritoneum is then, first of all, divided, and with blunt-pointed scissors the posterior wall of the duodenum is separated from the head of the pancreas, and as the small branches of the pancreatoduodenal artery are encountered they are individually caught up in clamps and ligated.

This dissection of the posterior wall of the duodenum is the crux of the operation. It is important not to center the

capsule of the pancreas in the dissection, because the entrance within the capsule of the pancreas favors the development of an acute pancreatitis, which may prove fatal

In perforated ulcers on the posterior wall of the duodenum such dissection requires considerable skill. One soon learns to recognize the line of cleavage between the indurated, perforated ulcer on the posterior wall and the capsule of the pancreas In this patient, as I dissect away the posterior wall,

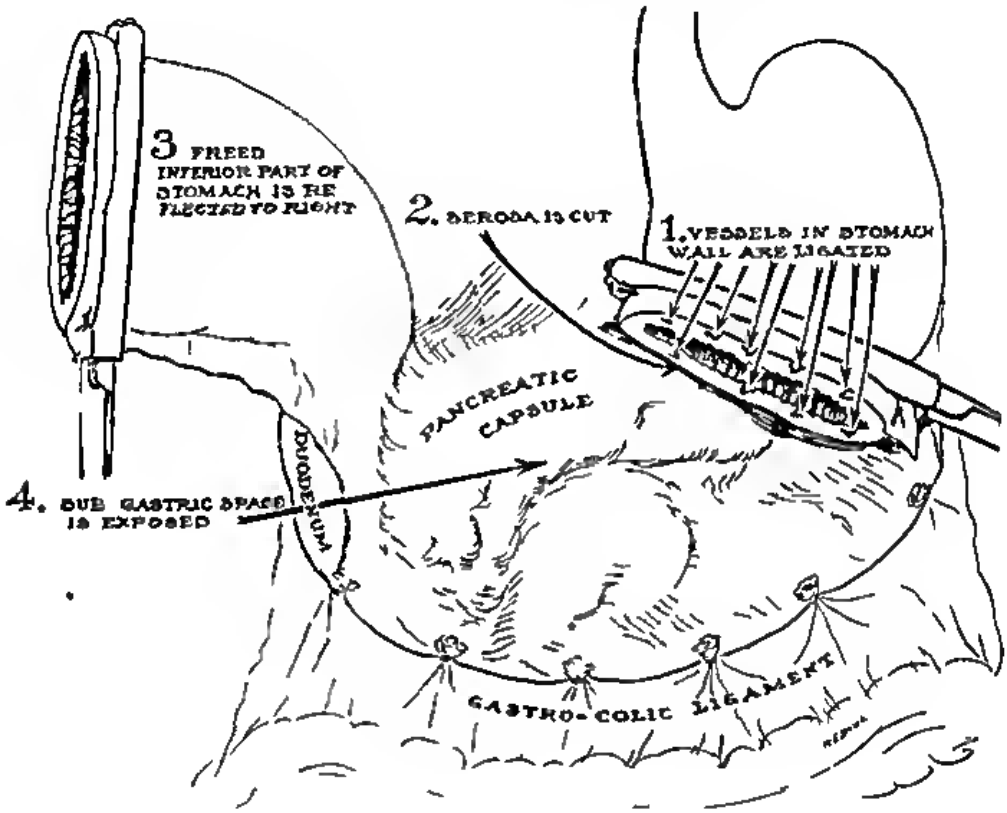

Fig 35

I find no lesion on the posterior wall of the duodenum The ulcer ends on the superior aspect of the posterior wall

In order to avoid this dissection on the posterior wall in the case of posterior ulcer, Finsterer has suggested that the ulcer be left *in situ* and the antrum and pylorus resected. He call this operation "resection zur aus-schaltung." I do not think this is a good operation I have never had recourse to it. It is well to know of different procedures, but as a regular, standard operation I would deprecate its use.

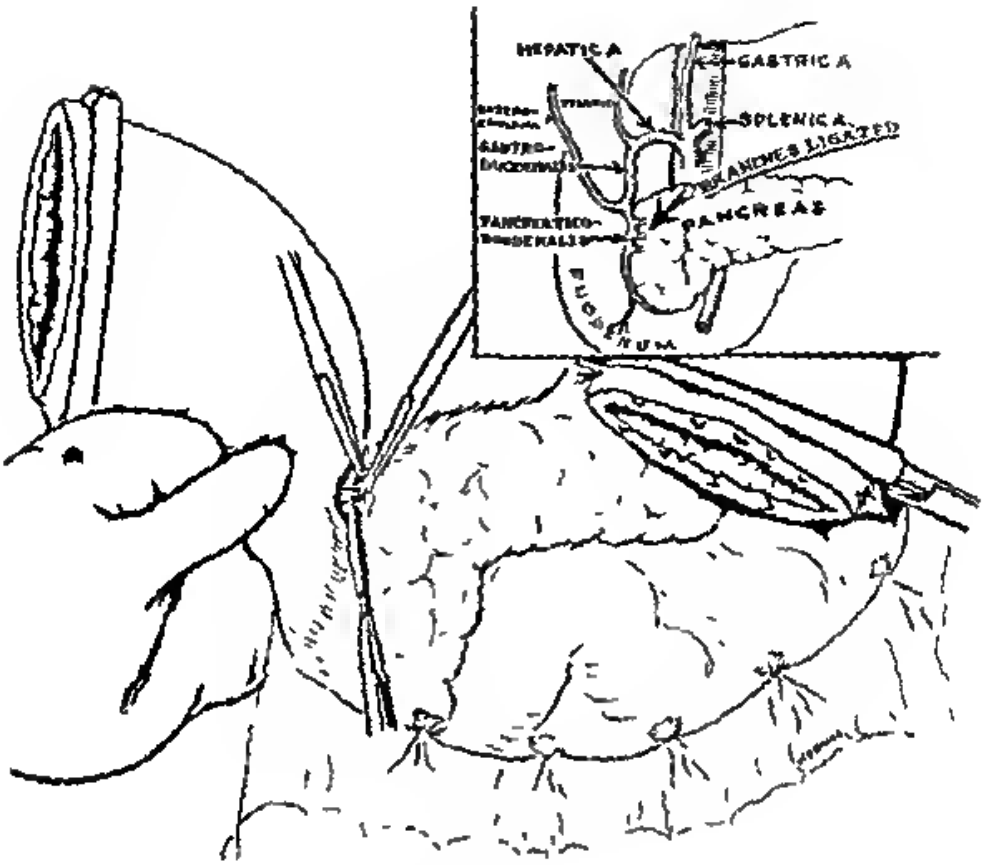

Fig 36.

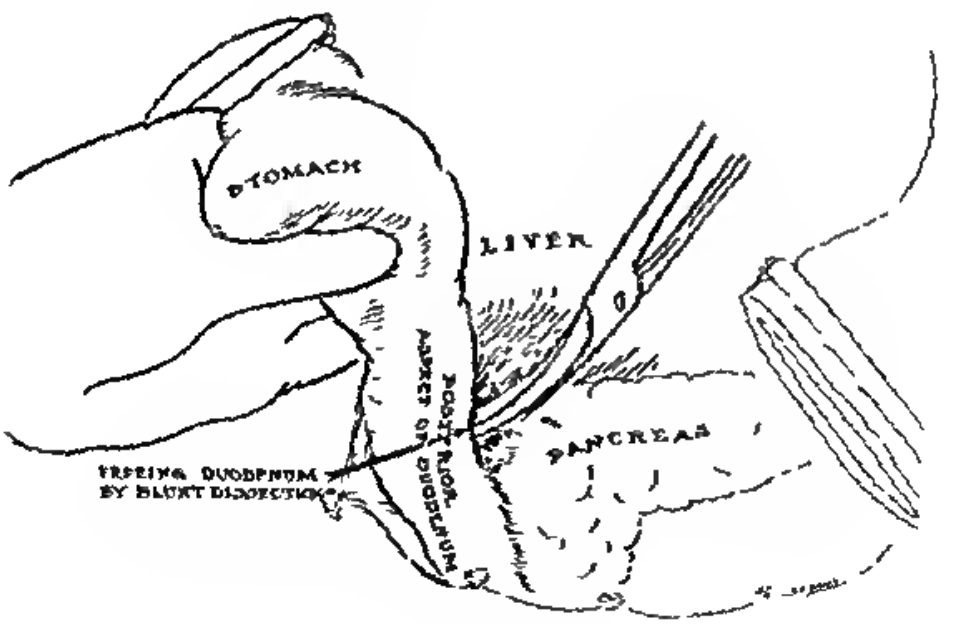

Fig 37

We dissect free the duodenum from the pancreas and from the upper layer of the free edge of the gastrohepatic ligament.

Occasionally it is necessary to dissect down into the second part of the duodenum. In one case I have dissected the second part to within $\frac{1}{2}$ inch of the papilla of Vater. It is essential that one who performs these operations should be well acquainted with the anatomy of the duodenum, pancreas, common bile ducts, etc. But, given such knowledge of the anatomic relations, given an average amount of skill and experience which enables one to recognize the line of cleavage, the dissection of the posterior wall of the duodenum may be readily carried out.

The stomach and duodenum have now in this case been freely mobilized, the blood-supply has been attended to, and we are

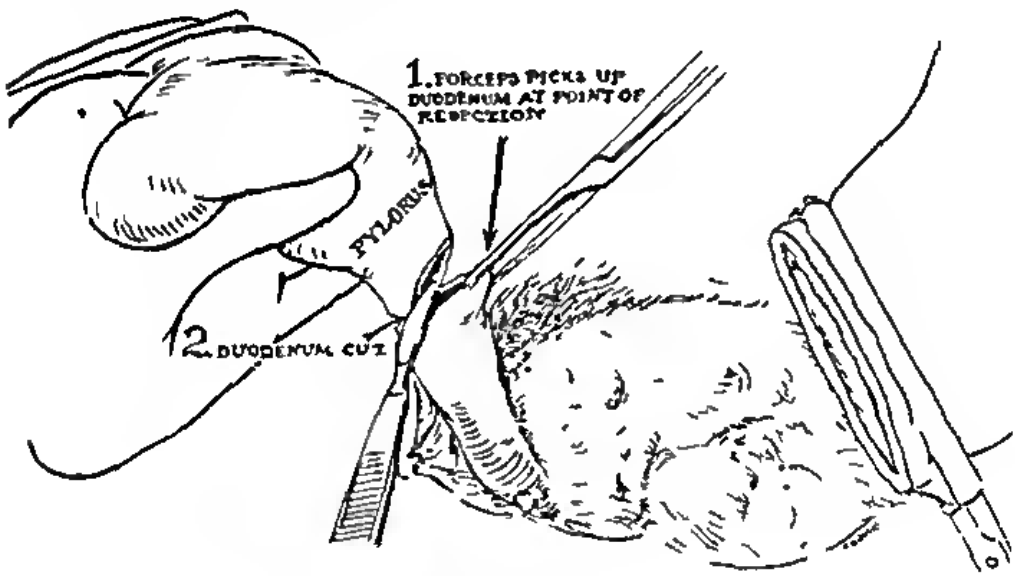

Fig 38

now ready to cut across the duodenum below the site of the ulcer. Examination of the specimen shows that we are $\frac{1}{4}$ inch below the margin of the ulcer. You will notice that I have not applied a clamp to the duodenum. I see no advantages of the application of such a clamp. The contents of the upper part of the duodenum are usually sterile. A clamp prevents us from exploring the duodenum below the point of section and so takes away the opportunity of direct inspection of the remaining duodenal mucous membrane. It is permissible for the beginner to leave behind an ulcer. It is not pardonable

for the experienced gastric surgeon to leave behind an ulcer in the duodenum.

We proceed now to a closure of the cut end of the duodenum. This is *done by three layers of sutures.* The first layer is a mattress-suture, passing from without in, and should effectively close the upper end of the duodenum. We lay much stress upon the accurate closure affected by the first tier of sutures. There must be no bulging or protruding of mucous membrane.

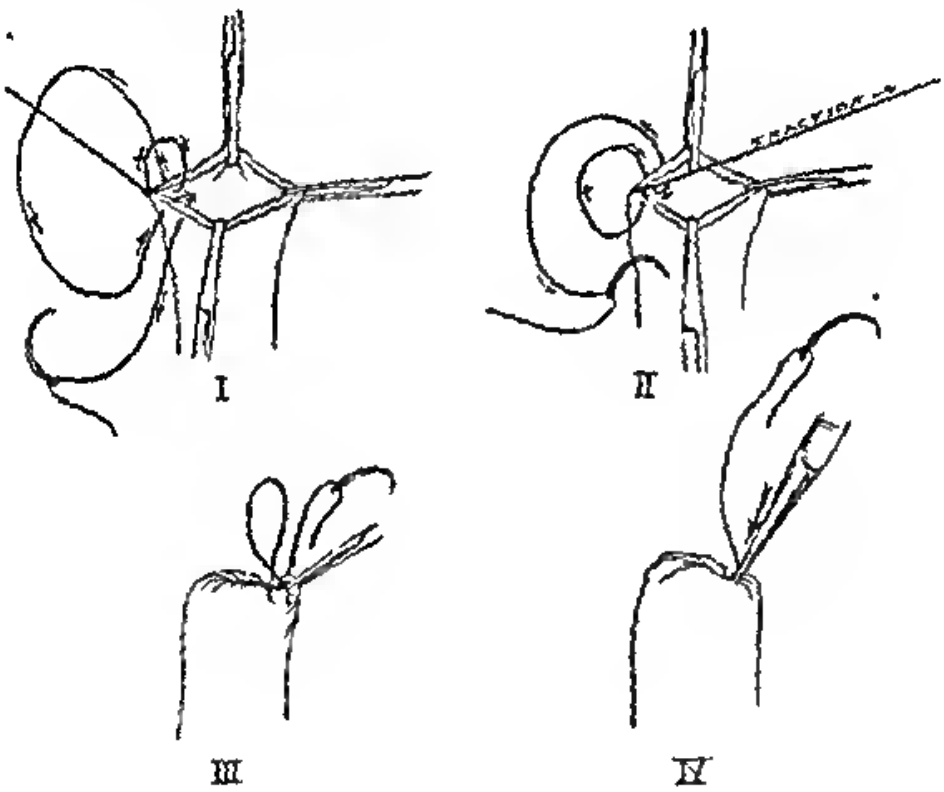

Fig 39

Over this first tier of catgut sutures we pass a second row of catgut or linen thread sutures which unites the head of the pancreas to the sutured end of the duodenum, and over this tier of sutures the peritoneum of the upper layer of the transverse mesocolon is sewed to the anterior surface of the duodenum, so that the entire duodenum suturing becomes retroperitoneal. If the duodenum is thus carefully closed, there will be no duodenal fistula. It is the rarest thing in our service to experience a duodenal fistula, and we ascribe this absence of fistula *forma-*

tion in the duodenum to the carefulness of our suture line. This completes now the closure of the duodenum. We cover the area with a wet compress and proceed to deal with the proximal end of the stomach

First of all, we tie off with fine catgut the small blood-vessels that have been seized by clamps during the section of the stomach and close the upper $\frac{1}{2}$ inch or so of the stomach by a mattress-suture of catgut. The object of such a suture is, first of all, to effect a sound, complete closure of the upper angle of the stomach Covering the remaining portion of the cut end of the stomach with a compress, we raise the transverse colon from

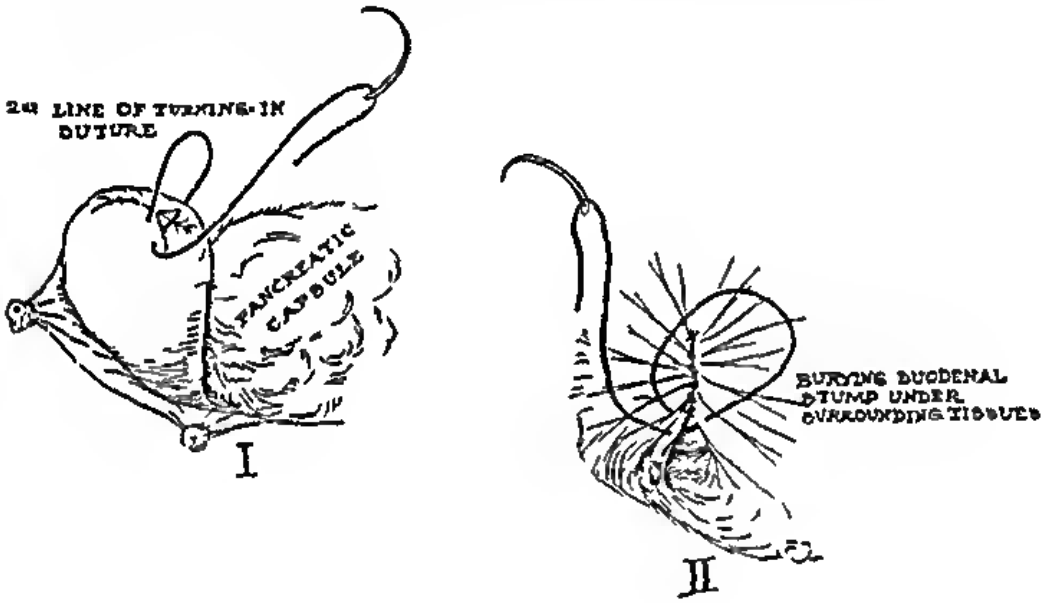

Fig. 40

the abdomen, and passing the finger down to the fossa jejuno-duodenalis we find the first portion of the jejunum, bringing it forward out of the abdomen. Raising the transverse mesocolon upward then, in order to afford free inspection of the colon, and thereby seeing and palpating the middle colonic artery—upon the importance of which I cannot lay too much stress—an incision is made about $2\frac{1}{2}$ inches long to the left of the middle colonic artery. Through this slit the first portion of the jejunum is pushed so as to bring it above the transverse mesocolon. The jejunum is placed alongside the cut end of the stomach. The portion which will rest freely, easily, and without traction against

the cut end of the stomach is grasped with fixation forceps and a long, straight clamp applied thereto. As a rule, the portion of the jejunum to be selected comes about $1\frac{1}{2}$ inches from the

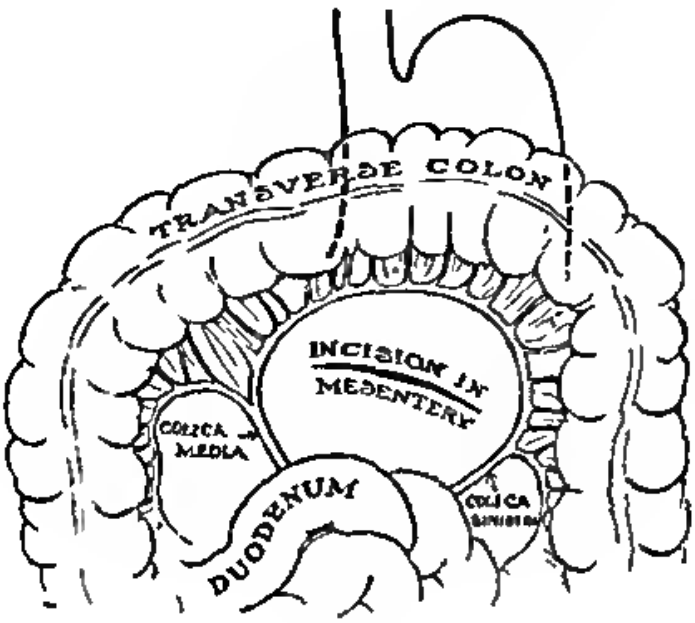

Fig 41

fossa jejunoduodenalis and extends down sufficiently to afford free space for fixation to the cut end of the stomach One leaf of the transverse mesocolon is now fixed to the posterior sur-

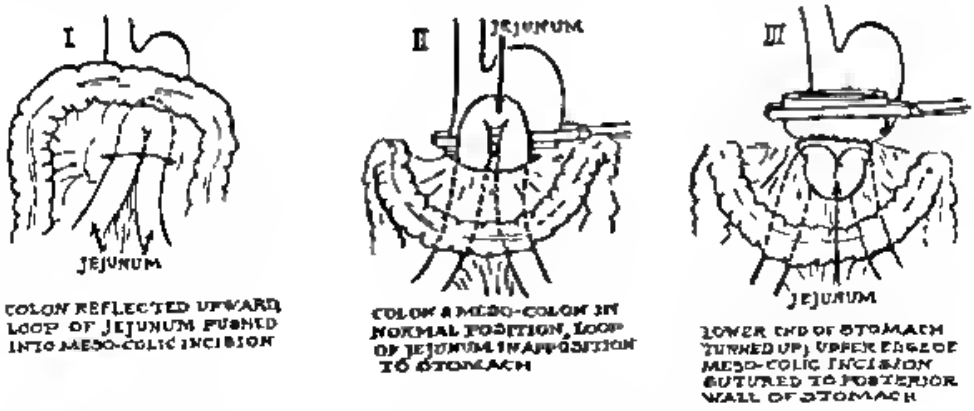

Fig 42

face of the stomach by catgut suture The clamp holding the proximal cut end of the stomach and the small intestine are now approximated and held in contact by an elastic band and an

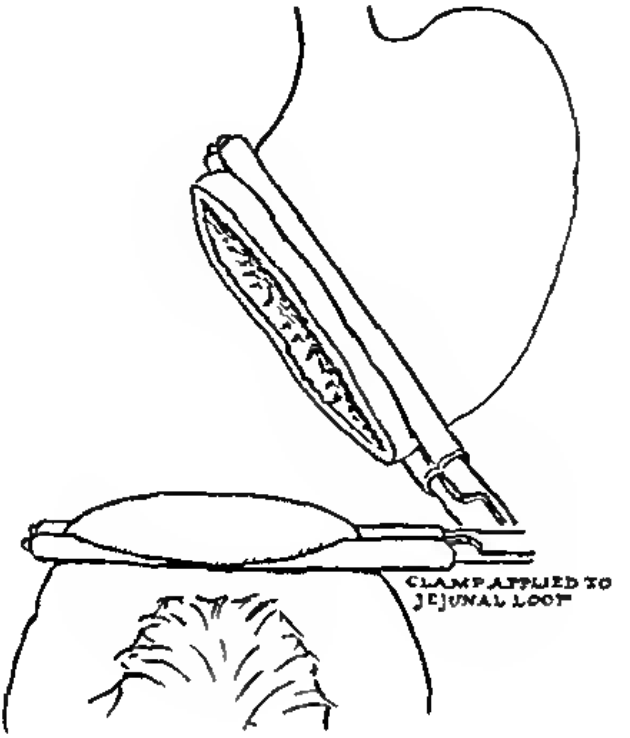

Fig 43

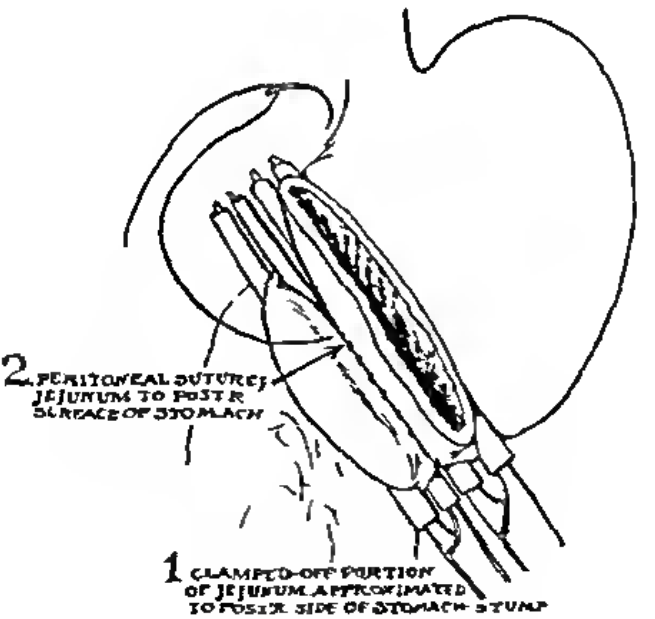

Fig 44.

end-to-side implantation of the cut end of the stomach into the jejunum is made in the manner that is followed in doing a gastro-enterostomy.

You may select the all catgut method or a linen suture for the peritoneum, and a catgut suture for the through-and-through inner layer of sutures. One is as good as the other. We have never found that a linen thread produced, provoked, aided, or occasioned the formation of a gastrojejunal ulcer. We have had gastrojejunal ulcers after the all catgut method, after the linen thread method, and after the Murphy button method. If a linen thread is occasionally found sticking in a gastrojejunal ulcer, it does not necessarily mean that the thread has occasioned the formation of a gastrojejunal ulcer. It is

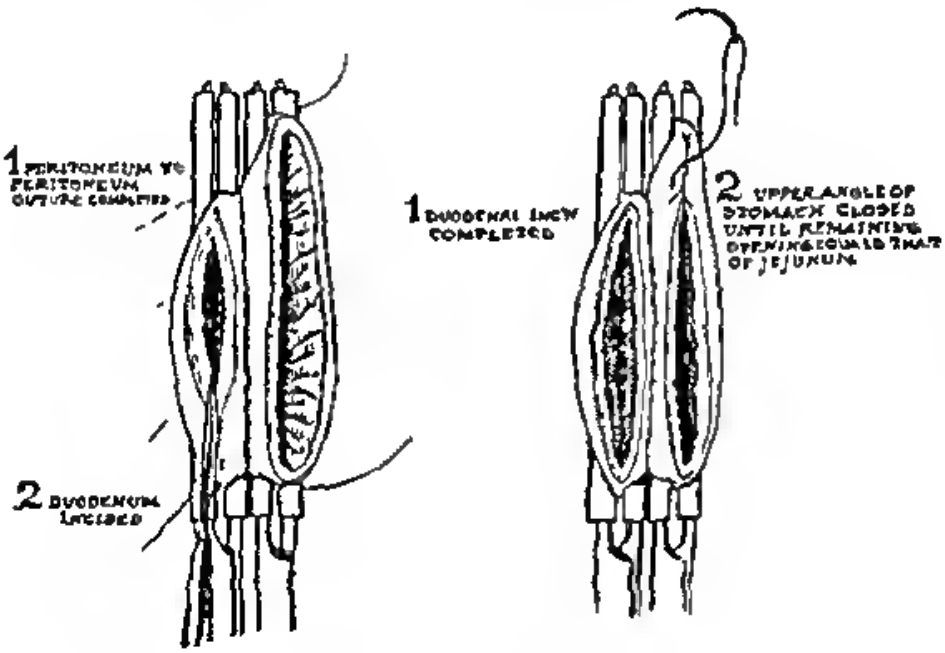

Fig 45

simply an accident Such an ulcer would have formed in the individual just as well after the all catgut method or after the Murphy button method, when no sutures are used.

Having implanted the cut end of the stomach into the jejunum, the small intestine that has been brought above the transverse mesocolon through the slit made therein is now replaced below the transverse mesocolon, and the remaining leaf of the transverse mesocolon is sutured to the anterior surface of the stomach, and as we look at the anastomosis that has been made in this patient we see that we have affected here a

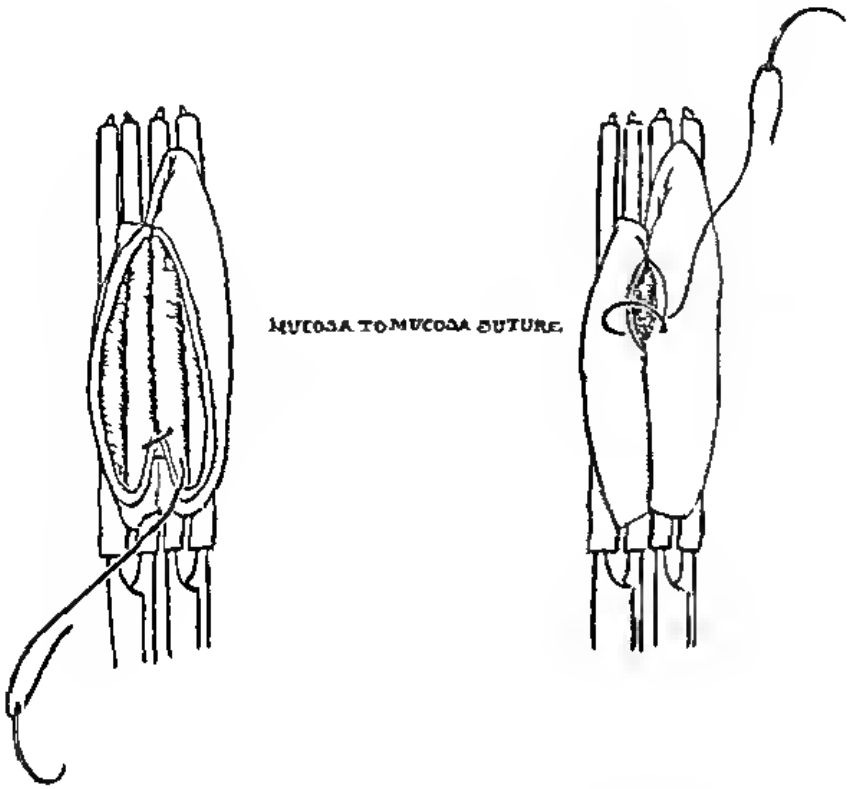

Fig 46

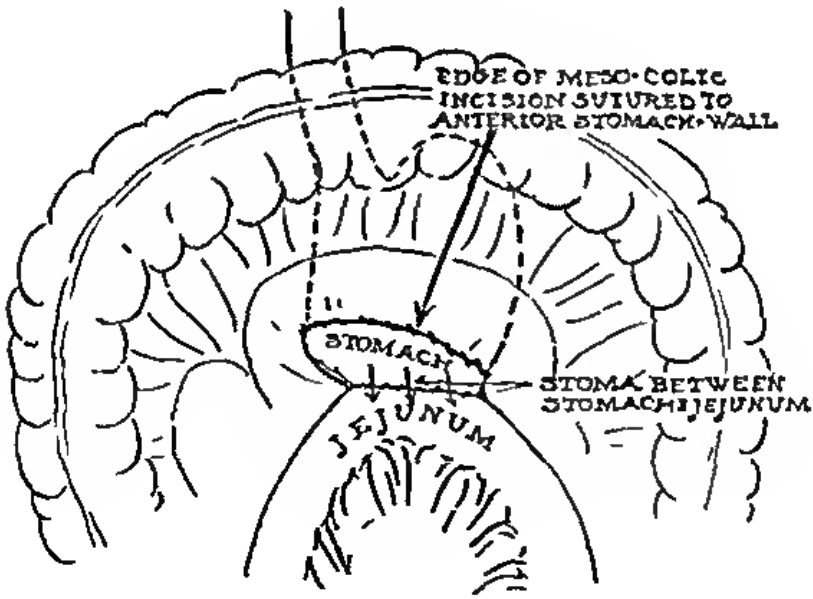

Fig 47

retrocolic posterior, no-loop anastomosis. In other words, our union has all the good qualities that we have learned to achieve in the *retrocolic, no-loop, posterior* gastro-enterostomy. The

parts are gently washed in saline solution, a drainage-tube is inserted below the liver to provide for seepage, and the abdominal wound closed with through-and-through silk sutures This operation, as you see, has taken about sixty-five minutes. The time consumed in this operation varies from forty-five to sixty-five or seventy minutes. There is no loss of blood There is no shock The patient should leave the operating-table with as quiet and good a pulse as he had when he came into the operating-room, and we shall find him on our rounds in the morning sitting up in bed, usually interested in the newspaper or in the amount of food or drink that is to be allowed him during the day The stages of this operation are shown in Figs 28 to 47, inclusive

The second patient to be operated upon this afternoon presents some very interesting clinical facts in her history, to which I shall only briefly allude In addition to the typical history of a duodenal ulcer, she has a marked pyloric stenosis with gastric dilatation of high degree She has had two attacks of tetany. I presume you are all well acquainted with one of the modern views as to the production of tetany as a complicating lesion to duodenal and pyloric ulceration.. It is thought, and the experimental physiologists seem to be satisfied with the proof that has been afforded, that the pyloric stenosis preventing chlorids from entering the duodenum disturbs the chlorid carbonate combinations in the duodenum and jejunum, and it is to this disturbance of the chlorid carbonate combination, and the deprivation of the chlorids attendant thereupon, that the pathogenesis of tetany is thought to be due.

In this patient there is, as you see, a very marked pyloric stenosis and the same operation that has been performed in the first patient will be carried out in this patient

Description of Specimens.—The removed part of the stomach and duodenum in the first patient shows that in the first part of the duodenum there is a large ulcer the size of a 10-cent piece with a distinct crater, and a smaller, so-called kissing ulcer on the mucous membrane of the posterior wall. There are several

small pinhead areas on the mucous membrane of the antrum of the stomach which represent the early stages of gastric ulceration and a moderate degree of pyloric stenosis

The specimen in the second patient shows a large penetrating ulcer on the posterior wall of the duodenum with a marked cicatricial stenosis of the pylorus the lumen of the stenosed part being scarcely as large as the common slate pencil

Postoperative Course —It might be interesting for you to know that the postoperative course of these patients has been entirely uneventful There was no vomiting no disturbance of any kind The patients made a smooth recovery At the time of their discharge from the hospital they were able to eat all simple cooked food in quantities of about 8 to 10 ounces every four hours By simple cooked food I mean fluids of all kinds cereals soft boiled eggs broiled chicken broiled chops mashed potatoes cooked fruits toast crackers The wounds have healed by primary union and the patients were discharged from the hospital sixteen days after operation

parts are gently washed in saline solution, a drainage-tube is inserted below the liver to provide for seepage, and the abdominal wound closed with through-and-through silk sutures This operation, as you see, has taken about sixty-five minutes The time consumed in this operation varies from forty-five to sixty-five or seventy minutes There is no loss of blood. There is no shock The patient should leave the operating-table with as quiet and good a pulse as he had when he came into the operating-room, and we shall find him on our rounds in the morning sitting up in bed, usually interested in the newspaper or in the amount of food or drink that is to be allowed him during the day The stages of this operation are shown in Figs. 28 to 47, inclusive.

The second patient to be operated upon this afternoon presents some very interesting clinical facts in her history, to which I shall only briefly allude. In addition to the typical history of a duodenal ulcer, she has a marked pyloric stenosis with gastric dilatation of high degree She has had two attacks of tetany. I presume you are all well acquainted with one of the modern views as to the production of tetany as a complicating lesion to duodenal and pyloric ulceration . It is thought, and the experimental physiologists seem to be satisfied with the proof that has been afforded, that the pyloric stenosis preventing chlorids from entering the duodenum disturbs the chlorid carbonate combinations in the duodenum and jejunum, and it is to this disturbance of the chlorid carbonate combination, and the deprivation of the chlorids attendant thereupon, that the pathogenesis of tetany is thought to be due

In this patient there is, as you see, a very marked pyloric stenosis and the same operation that has been performed in the first patient will be carried out in this patient

Description of Specimens.—The removed part of the stomach *and duodenum in the first patient* shows that in the first part of the duodenum there is a large ulcer the size of a 10-cent piece with a distinct crater, and a smaller, so-called kissing ulcer on the mucous membrane of the posterior wall. There are several

MT SINAI HOSPITAL

Clinic of Dr Edwin Beer

Exploratory Laparotomy, Lymphosarcoma of the Small Intestine

Ureterolithotomy for Ureter Calculus

Dumb-bell Stone in the Bladder and Diverticulum, Suprapubic Cystotomy and Removal of Stone from Bladder and Diverticulum, with Obliteration of Diverticulum after Excision of Outer Wall

Ureterovesical Anastomosis, with a Rubber Tube in a Patient with Solitary Kidney, Whose Lower Ureter Had Been Completely Stenosed Following the Removal of a Giant Ureter Calculus

Demonstration of Dr Beer's Suprapubic Drainage Cup (Demonstration by Dr Leo Edelman)

Splenectomy for Purpura Hæmorrhagica

Bilateral Kidney Operation Under Spinal Anesthesia in Uremic Patient

This afternoon the presentation has been arranged as an operative clinic and as a demonstration In the large operating room the operative series will be demonstrated and in the adjacent room my associates, Doctors Hyman, Ashner, and Edelman will demonstrate a number of interesting slides and specimens, as well as various methods of making patients comfortable after operations on the bladder

EXPLORATORY LAPAROTOMY, LYMPHOSARCOMA OF THE SMALL INTESTINE

The first case in the operating room will be a young woman of twenty nine who gives the following history

During the last three years the patient has experienced a

sense of fulness and distention, especially after eating. For the last fourteen months she has had diarrhea, and during the last six months she has noticed progressive enlargement of her abdomen. About four months ago she was operated upon in one of the New York hospitals and the appendix was removed. The operator at that time found no other lesion.

Our examination has shown a very marked distention of the abdomen, with a fluid wave which, from time to time, was very easily obtained, and at other times, as the fluid was absorbed, the wave disappeared. When her abdomen was somewhat empty a mass could be felt above the umbilicus running transversely, suggesting a coiled-up omentum, and this morning on palpation to the left of the umbilicus a little hard mass about the size of a peach was recognizable. The examination of her chest with the aid of *x*-ray was negative and there were no signs of tuberculosis in the lungs The urine was negative. The vaginal examination showed no secondary deposits in the pelvis and the adnexa were not enlarged

Despite the absence of any evidence of tuberculosis, it was thought that the patient probably had a tubercular peritonitis, and she was transferred to the surgical service for exploration, with this diagnosis in mind. It was impossible, however, to be sure that the patient did not have a malignancy with secondary ascites. If the diagnosis of tuberculosis could be made in such a case without operation, the question would come up whether the patient should not be treated by heliotherapy, as the reports from Leysin (Rollier) suggest that all tubercular peritonitis cases, even those with extensive disease of the tubes or intestines, do best under heliotherapy.

In view of the fact, however, that in this case the diagnosis of tuberculosis cannot be definitely made, it has been decided to explore. As the original operation was in the lower left rectus, to avoid any adhesions, today the incision will be made in the upper part of the left rectus muscle, because experience has shown that any injury to an adherent tubercular piece of intestine is liable to be followed by a fecal fistula.

After opening the abdomen through the upper left rectus

muscle, as you see, considerable turbid fluid is encountered, and at this level there are no adhesions, all the appendices epiploicæ, as can be readily seen at a distance, are densely infiltrated, looking like grapes, and on the surface of the small intestine there are a number of small, flat, pink to white deposits that look like tubercles It is practically impossible to say that these are

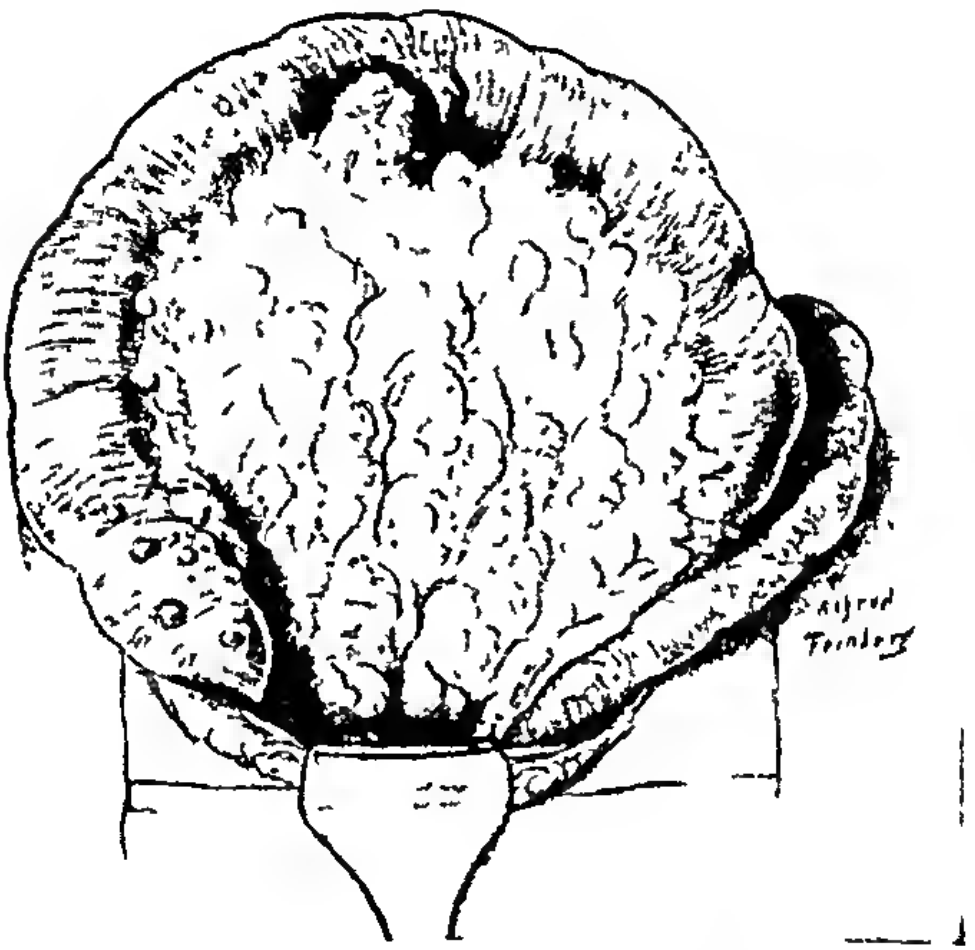

Fig 48 —Lymphosarcoma of small intestine

tubercles from the gross appearance, as sarcoma and carcinoma produce almost an identical picture As we expose the small intestine further we encounter in the mesentery a huge mass of lymph-glands, some of them still discrete, but most of them baked together with their adjacent neighbors, making a mass which practically fills the whole mesentery (Fig. 48). On further examination this large loop of gut is found about $2\frac{1}{2}$

feet long, very much dilated, so that it looks larger even than the colon, with all its walls infiltrated, of leathery consistency, presenting the typical picture of the rare disease known as lymphosarcoma of the small intestine. At one spot in this dilated loop at the mesentery attachment there is a protuberance of a part of the tumor from the mesentery into the lumen of the gut A specimen will be taken from the peritoneal surface, where there is a small deposit resembling a tubercle, for microscopic examination [1]

It is evident, from what we have found, that the suspicion of tuberculosis of the peritoneum was not warranted, and that we are dealing with the unusual disease of lymphosarcoma of the small intestine. This disease is so rare that I suppose most of the men in the room have never seen a case of it. Strange to say, in this particular institution, Mt Sinai Hospital, among our patients this disease, although very rare, is still much more common than in other institutions in this city Some years ago one of our staff collected, I believe, 15 similar cases occurring in our wards, and described the clinical picture It is interesting to emphasize that though these patients have these extensive tumors in the small intestine, practically never does intestinal obstruction develop The involved loop of intestine, instead of contracting, seems to dilate, so that we have a diffuse dilatation at the site of the diffusely infiltrating tumor, without any tendency toward constriction

In closing the abdominal wall, in view of the findings, heavy chromic gut, interrupted stitches will be used The peritoneum will also be closed with heavy chromic gut As far as postoperative care of this patient is concerned, deep *x*-ray therapy will be instituted as soon as the wound is properly healed.

URETEROLITHOTOMY FOR URETER CALCULUS

The second case this afternoon is a ureterolithotomy for ureter calculus in the lower end of the left ureter This young man of thirty-six has been sick for two years, with pain in the left lumbar region. The attacks of pain have been inter-

[1] Pathologic report on the removed specimen is lymphosarcoma

mittent and associated with vomiting and frequency of urination. The cystoscopic examination has shown a swelling of the left ureter orifice, but no obstruction to the passage of catheters. The functional test showed an adequate left and right kidney and the *x*-ray examination showed a large triangular concretion in the lower left ureter close to the bladder (Fig. 49). Judging from the *x*-ray, the stone measures on each side almost $\frac{1}{2}$ inch.

Previous to admission to the hospital in the Out-patient Department a positive scratch mark had been obtained, so

Fig 49.—Ureter stone

that there is very little doubt that a fair-sized impacted calculus will be found. The question of the passage of such a stone without operation might be raised. In our experience, stones as large as this rarely, if ever, are passed normally. Smaller stones, up to the size of a pea, are often passed and cystoscopy, we find, can help these stones to pass, by using a technic which we have been employing during the last year or more. We found out accidentally in a patient with bilateral ureter obstruction due to calculus, who was anuric for seventy-two hours,

that, having left two ureter catheters in his kidney pelvis for seventy-two hours to relieve the anuria and pain, on withdrawing the catheters at the next urination the patient voided his ureter stones. Since this experience we have regularly in ureter stone cases, where the stone can be passed by the catheter, allowed the catheter to remain *in situ* for three or more days, hoping in this way to be able to deliver the stone, and in over 50 per cent of the cases we have thus been able to liberate the stones and aid their passage into the bladder

In this case it is evident from the size of the stone that operative removal is necessary, and to approach the ureter

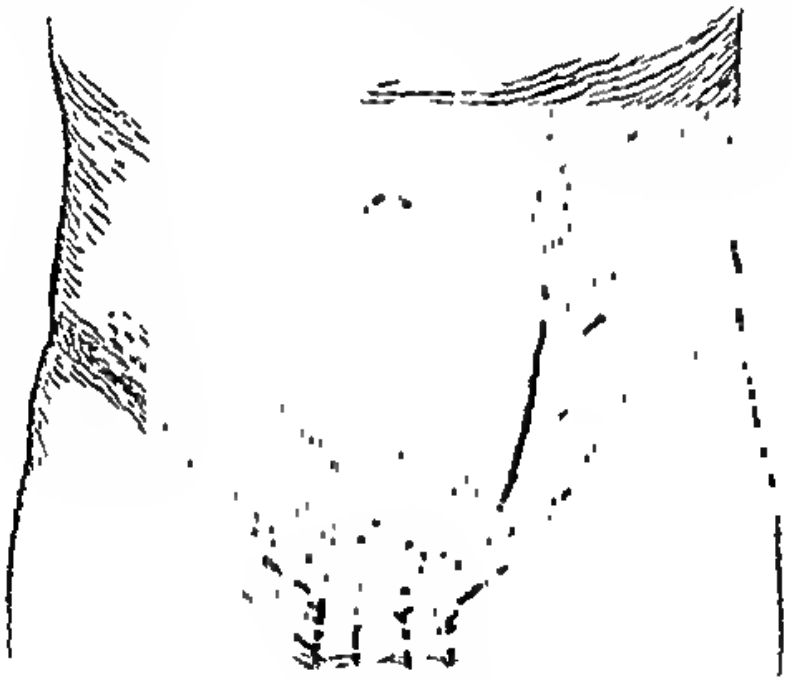

Fig 50

we regularly use the simplest approach through the rectus sheath, staying outside the peritoneum. This is a practically avascular incision, as you see, cutting through the anterior sheath of the rectus (Figs 50–53), the rectus muscle is drawn mesially and the extraperitoneal fat is exposed. By pushing this fat mesially with the peritoneum the ureter is easily found, as at this level the ureter is adherent to the peritoneum just above the bifurcation of the iliac arteries. The ureter in the lumbar region does not adhere to the peritoneum and, if one follows the peritoneum

in the lumbar gutter, one is liable to get away from the ureter; whereas in the iliac fossa one must adhere to the peritoneum, as the ureter is always intimately related to it.

If we follow this ureter down, it is, as you see, not dilated, and it manifests itself by its peculiar transverse and longitudinal blood-vessels which may be seen running in short twists in the wall. As we follow this structure down we see first the vas deferens, which is being held up by this small retractor crossing

Fig 51

in front of the ureter, and low down in the pelvis, below the crossing of the vas, the impacted ureter stone may be felt. If the ureter above the stone were dilated, the easiest thing would be to open the ureter well above the stone and fish out the stone with a small stone forceps Unfortunately, in this case, the ureter above the stone is not dilated, and it will be necessary to liberate the ureter down to the site of the stone and then incise the ureter, as I am doing, and deliver the stone. The ureter is open now, and those of you who are near enough

may readily see the stone in the dilated lower part of the ureter close to the bladder wall. After taking out the stone, it would be advisable to take a couple of stitches in the ureter, although, owing to the great depth, it is scarcely worth while dissecting the ureter free enough to pass such sutures. Consequently, we will not attempt to pass these stitches, and use a rubber-dam for drainage and close up the abdominal wall in layers, bringing out the small piece of rubber-dam, which will take

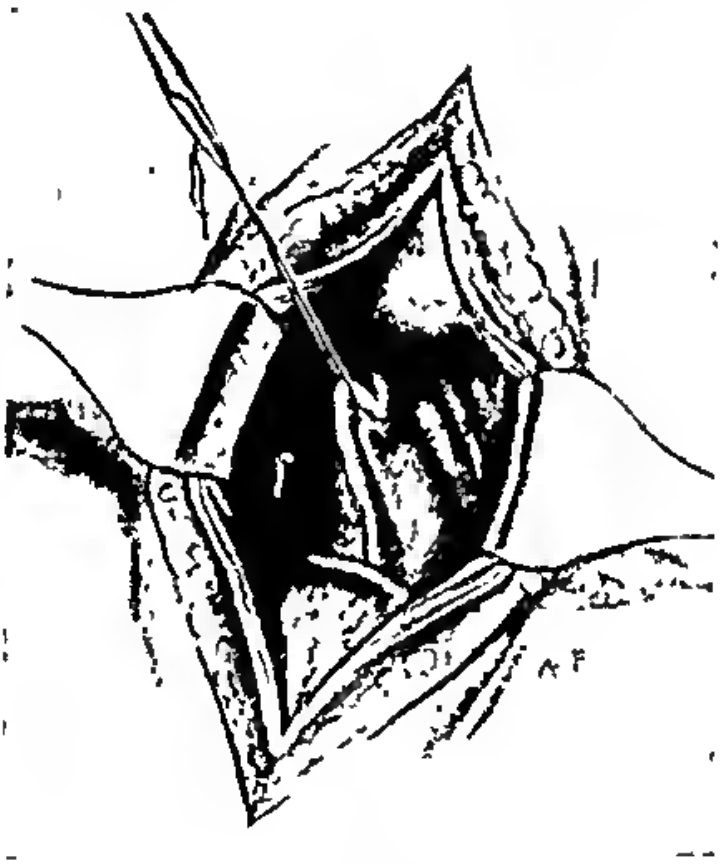

Fig 52.

care of any leakage through the lower angle of the incision. Experience has shown that even though the ureter or the pelvis of the kidney be left open there is not necessarily an escape of urine. Many of these cases do not leak at all and close as if they were most accurately sutured. It is always wise after delivering the stone to pass a probe into the bladder and in this way be certain that no fragments are left behind to block the lower ureter.

In exposing the lower ureter extraperitoneally it is also always wise to protect the iliac vessels, so that retractors do not traumatize their walls. When there is a great deal of inflammation about the ureter it is often impossible to make a very satisfactory mobilization of the ureter without risk of tearing it. For this reason, in this particular case, the lowest end of the ureter was left fixed in the floor of the pelvis and not pulled up, as may

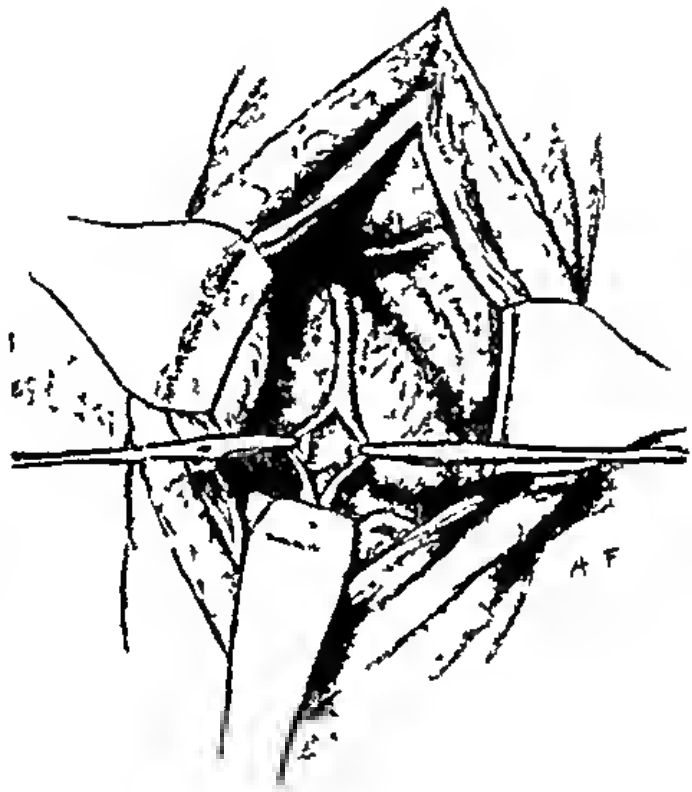

Fig 53

so regularly be done when the inflammation about the ureter is only moderate.

There are a number of cases where the lower ureter is blocked close to the bladder and no specimen can be obtained cystoscopically. *x*-Ray in such cases may or may not show a foreign body in the approximate position of the ureter. If the patient has had attacks of pain, with or without bleeding, has some frequency, and the ureter is blocked as mentioned above, and the *x*-ray shows a shadow close to the position of the ureter

near the bladder, one is liable to assume that one has to deal with a stone blocking the lower end of the ureter. These cases can be most difficult to interpret, and it has been our experience that a number of them have been cases of stricture of the lower end of the ureter, due to tuberculosis, in which nature has performed autonephrectomy, and the *x*-ray shadow has been caused by an extra-ureteral calcification. One must be on the lookout for such cases of autonephrectomy, which are by no means uncommon and are almost regularly missed by the inexperienced At the Bellevue Clinic in two days I expect to operate on just such a case, tuberculous ureter stricture with exclusion of the tuberculous kidney, and remove kidney and ureter by the technic that I have described as "aseptic nephro-ureterectomy."

DUMB-BELL STONE IN THE BLADDER AND DIVERTICULUM; SUPRAPUBIC CYSTOTOMY AND REMOVAL OF STONE FROM BLADDER AND DIVERTICULUM, WITH OBLITERATION OF DIVERTICULUM AFTER EXCISION OF OUTER WALL

The third case is a male, aged sixty-seven, operated on at Wilkesbarre, Pa., eight months ago for prostatic adenoma and bladder stone. Despite operation, patient complains of symptoms similar to his original symptoms and comes to New York for relief *x*-Ray examination of the urinary organs showed a large concretion in the right side of the pelvis about the size of a small plum and very dense; extending from this by a narrow neck was a much softer concretion which occupied the position of the bladder. Cystoscopy showed that patient had a stone in his bladder which was moderately soft, and it was impossible to see the narrow neck which connected this stone with the dense stone in the *x*-ray On the *x*-ray picture prior to the cystograms the diagnosis of dumb-bell or collar-button stone was made, as the picture was quite typical. With the cystogram, one may see in the reduced photograph the connection between the bladder stone and the stone in the diverticulum (Figs 54, 55). The other dark shadows in the cystogram are due to other small diverticula which are still filled with the iodin solution which has remained in these pockets after air has been introduced.

In opening this patient's bladder we are compelled to go

Fig 54 —Dumb bell stone

Fig 55 —Dumb-bell stone (picture reversed)

down through the old suprapubic vertical scar and, owing to the previous operation, some care will have to be taken to avoid opening the peritoneum. Naturally, such an opening into the peritoneum, if made prior to the opening of the infected bladder, will be of no particular danger, but if it is opened after the infected bladder has been entered, some danger of peritonitis will arise

Having opened the bladder by this midline incision, as you see, in the bottom of the viscus we encounter the large, soft

Fig 56

stone shown in the cystoscopic picture and the *x*-ray. Having delivered the intravesical stone, we feel, running into the right base of the bladder, the hard, narrow projection of that part of the stone which is sitting in the diverticulum. By dilating the neck of the diverticulum we can deliver this stone with the blunt forceps, and you see, after withdrawing the stone, that it is of altogether different consistency from the stone which was present in the bladder (Fig. 56). The stone in the bladder undoubtedly is a recent formation, and one-half of the dumb-bell had been removed previously by the first operator. Since

that operation a new stone bas formed, as so frequently happens when a stone is present in the diverticulum Although it is not essential in this case to remove the diverticulum, still it is better to excise this if it is feasible These diverticula of the bladder may be of every size One removed years ago by me had a capacity of 26 ounces In this particular case which we are operating on now the capacity is probably less than 2 ounces.

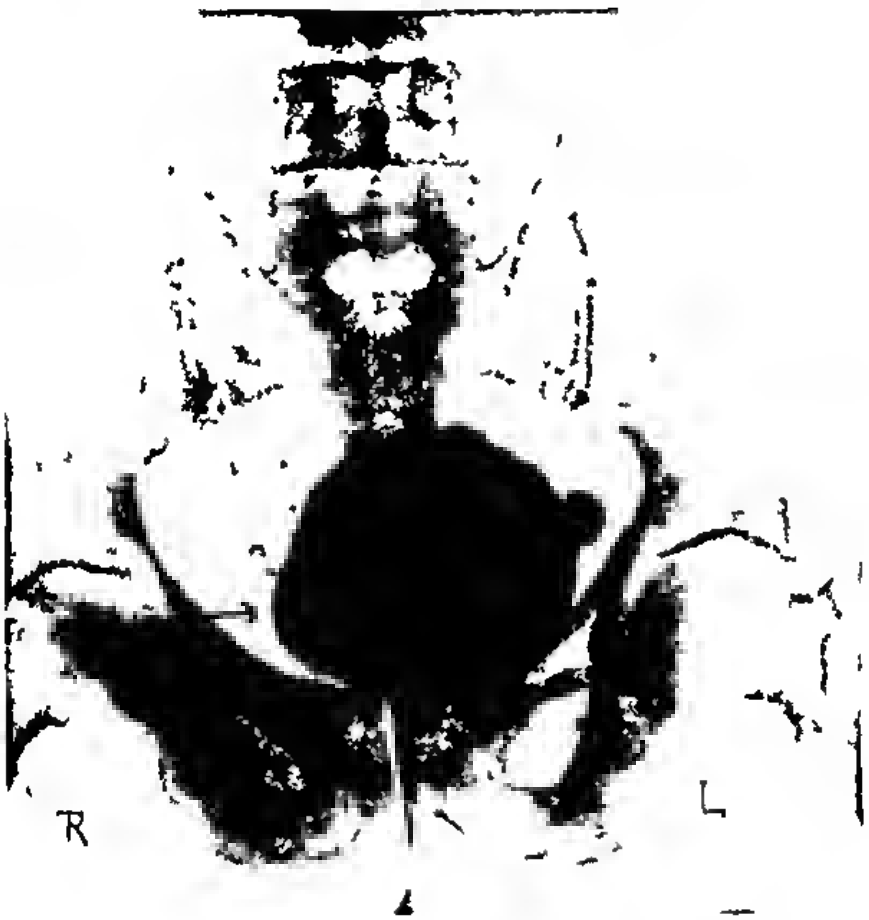

Fig 57.

If there is a good deal of peridiverticulitis the operation can be a most difficult one With one finger in the diverticulum and the other extravesical, I am dissecting the diverticulum bluntly from the adjacent perivesical tissues As I approach the apex of the diverticulum I find the adhesions so firm, due to inflammation, that it would seem unwise to attempt to remove the whole structure. Therefore, we cut down the right wall of the bladder to the neck of the diverticulum, excise the liberated

part of the wall of the diverticulum, and invert the piece of the diverticulum into the bladder. suturing the incision just made with two layers of catgut

Having closed this incision and obliterated the diverticulum almost completely, and having avoided the right ureter which you have seen directly mesial to the diverticular orifice, the bladder is closed, except for a suprapubic tube, and the abdominal wall closed in layers As this patient was rather a weak individual, he was prepared for operation by preoperative digitalization, and he should stand the operative procedure very well [1]

Some of these diverticula have been seen by us in young children, and my associate, Dr Hyman, has removed 2 enormous diverticula in a child of eleven months. We have had others in children of less than five who have also presented large diverticula, with residual urine of 5 and 6 ounces, in whom we have excised the diverticulum and in most cases reimplanted the corresponding ureter which had been involved in the diverticular wall. All our cases in children have done very well and have made very satisfactory convalescences One has been observed for over ten years and has grown up a healthy young man

URETEROVESICAL ANASTOMOSIS, WITH A RUBBER TUBE IN A PATIENT WITH SOLITARY KIDNEY, WHOSE LOWER URETER HAD BEEN COMPLETELY STENOSED FOLLOWING THE REMOVAL OF A GIANT URETER CALCULUS

This very unusual case is a patient twenty-seven years of age, who complained for the last five years of pain in the left side, in the groin, and in the back. Without going into an extensive report of the laboratory findings and previous operations, let me say that this patient during the attacks of pain noticed an oliguria. On cystoscopic examination it was demonstrated that she had an obstruction of the left ureter close to the bladder and that she had no right ureter. In other words, that she had but one kidney.

[1] Patient made an uneventful recovery Figure 57 is a cystogram before discharge, showing obliteration of diverticulum.

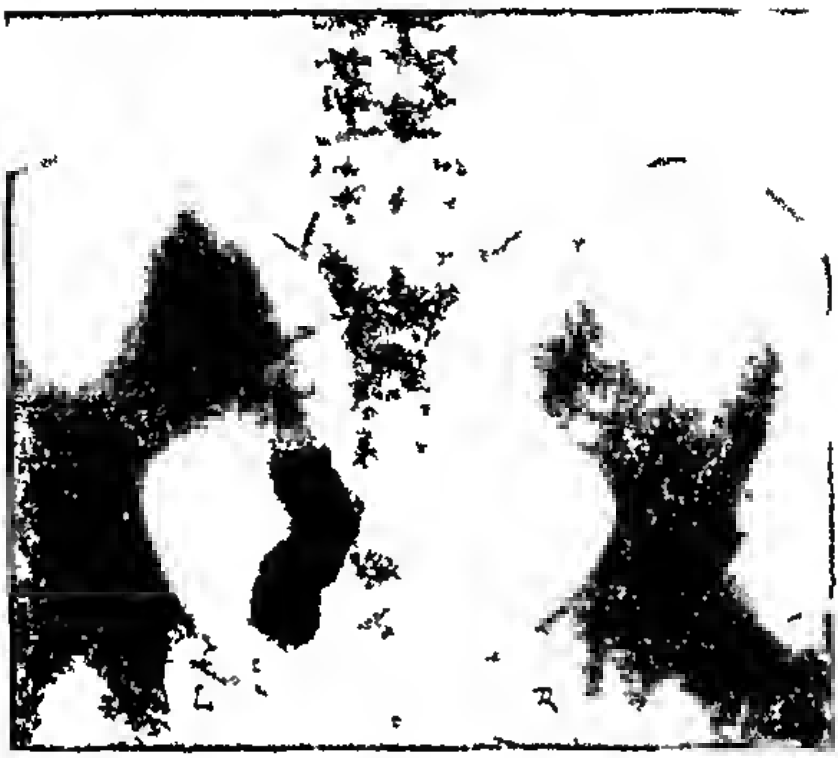

Fig 58 —Giant ureter stone

Fig 59 —Giant ureter stone

The x ray shows in the lower left pelvis as is seen in the pictures (Figs 58, 59), the largest ureter calculus that I have

across and an anastomosis with the duodenum re-established by means of a rubber tube. It is important in the after-treatment, provided the patient survives the shock of this extensive procedure, to keep the urine very acid, so that no calculi will

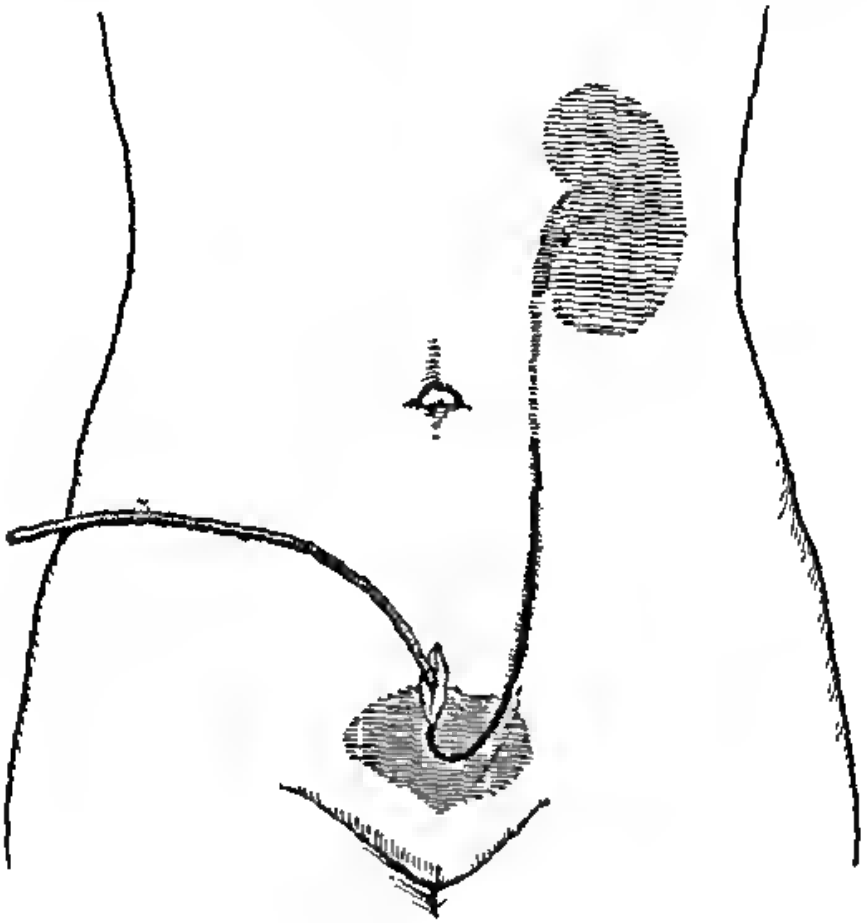

Fig. 60

form on this tube which we hope to leave in place for at least four or five weeks.[1]

DEMONSTRATION OF DR. BEER'S SUPRAPUBIC DRAINAGE CUP (DEMONSTRATION BY DR. LEO EDELMAN)

This cup (Fig. 61) is made up of two pieces, is very light, and has two outlet tubes, so that the patient can roll from side to side and still remain dry. The cup is attached to the small supra-

[1] December 6th: Patient is out of bed and tube is functioning very satisfactorily.

pubic opening by means of a zinc oxid cement which is obtained from Johnson & Johnson, and is the same as is used in the making of their zinc oxid adhesive This ZO mass is dissolved in benzin and then the benzin is allowed to evaporate until the paste is as thick as tar. A thin layer of this adhesive is then smeared upon the lip of the cup and, having attached to the outlet tubes

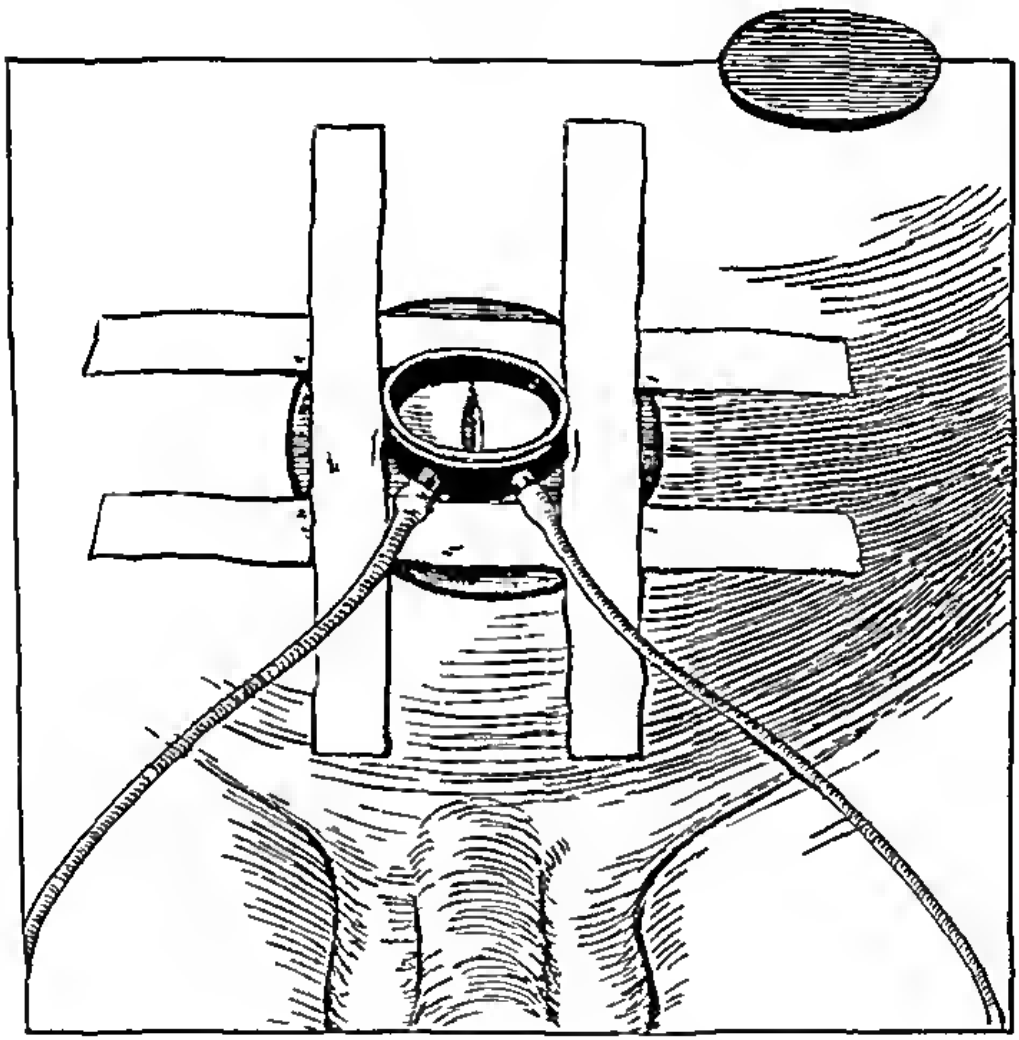

Fig 61

small rubber drainage tubes, the whole cup is glued in place and reinforced with adhesive plaster. Such an application made to dry skin, provided the opening in the abdomen is not too large, will collect almost all the urine following suprapubic cystotomies and make the patient, therefore, much more comfortable than when he is leaking into his bed In some cases one applica-

tion of the cup has been all that was necessary in the post-operative care of prostatectomy cases after removal of the ordinary drainage instituted at the time of operation.

At times we have been able to recover through such a cup over 3000 c.c. in twenty-four hours The saving in gauze prior to the war on each patient who was using the cup, as compared with those who were allowed to drain into gauze, amounted to more than $10. With a corresponding increase in cost since the war, there is a greater increased saving. The cup is made for us by Tiemann and has been in use for some fourteen or fifteen years. It may be used not only for such cases as mentioned above, but may be used for the drainage of biliary fistulas and similar conditions, as it is very light and easily applied The most important thing in connection with the application of the cup is to have the proper adhesive material and, although we have used regularly the zinc oxid mixture prepared as above, I suppose it would be perfectly possible to use other cement just as effectively

SPLENECTOMY FOR PURPURA HÆMORRHAGICA

The patient is a young girl of seventeen, who has been troubled with hematuria for some weeks On examination her thighs show most extensive ecchymosis and the patient says that her menstrual periods are very prolonged. Examination at the hospital showed no enlargement of the spleen, a bleeding time up to forty-five minutes, and a coagulation time of six to seven minutes The blood-platelets were 10,000. The diagnosis, therefore, was very evidently one of true purpura hæmorrhagica (thrombocytopenic) and, in view of the experience obtained in these cases following splenectomy, the medical consultant, Dr. Brill, advised this treatment for the patient. Originally patients with enlarged spleens and purpura were splenectomized and it was found they did well Subsequently, Minkowski, I believe, observed that, in view of those good results, it might be worth while to do a splenectomy when the spleens were not palpable Up to date I recently saw that the Mayo Clinic had done 4 splenectomies for purpuras, with

satisfactory results, and under the influence of Doctors Brill and Rosenthal at this Hospital we have already done 8, with most satisfactory results. Of course, when it comes to operating on a patient of this sort, the fact that the bleeding time is so prolonged is liable to give the operator an urge for quick work, as the wound bleeds often like a sponge until the spleen has been removed. In the case that was splenectomized by me for purpura hæmorrhagica about two years ago the young man made an uneventful recovery and is now, according to follow-up, in perfect health.

The oldest case of this sort is about six years old, reported by Kaznelson, and is in perfect health.

In approaching the spleen I shall make use of an incision parallel to the left costal arch and I sincerely hope that there will not be too many adhesions, as the longer it takes to deliver the spleen, the more blood will be lost. The patient is prepared for a postoperative transfusion, which will undoubtedly be necessary, as it is evident from what we see that every bit of the abdominal musculature is oozing actively and it is impossible to clamp all the vessels.

The abdominal cavity being entered, we find that the spleen is only moderately adherent at its upper pole and laterally, and having tied off doubly the vasa brevia, going to the greater curvature of the stomach, and separating the adhesions to the parietes, we can deliver this spleen and dispose of the splenic artery the same as we do with the kidney pedicle. In addition, there is a supernumerary small spleen in the colophrenic fold, which we are removing separately. In view of the fact that very little blood is lost and in view of the fact that we have separated the tail of the pancreas from the spleen in delivering it and have not damaged the tail of the pancreas in any way, we can afford to close this abdominal wall with heavy chromic gut without drainage. If there had been any chance injury to the tail of the pancreas or to the stomach wall a tube drainage into the space whence the spleen has been delivered would be advisable. In some cases in which the spleen is very adherent it has been reported that very large veins traverse the diaphragm

and enter the upper portion of the spleen If such veins are present, careless delivery of the spleen may tear them and lead to a fatal hemorrhage Bastianelli, in Rome, has told me that in such cases he has approached the upper pole of the spleen through the chest. After removing the pleura from the diaphragm, he has opened through the diaphragm and ligated these large vessels and then delivered the spleen through his original abdominal incision. It is astonishing how well these patients do As one author has said, they are practically snatched from the jaws of death [1]

BILATERAL KIDNEY OPERATION UNDER SPINAL ANESTHESIA IN *UREMIC PATIENT*

This patient has heen sick for four years with symptoms suggesting a renal tuberculosis Her blood chemistry shows over 100 urea nitrogen and 6 5 creatinin She is vomiting all the food that is given her and is emaciated to skin and hones. The cystoscopic examination is most difficult, not so much hecause the patient is intolerant, but it is impossihle to clear the hase of the hladder of pus even hy massage through the vagina. *Ureter catheterization is out of the question on account of the* extensive disease. The picture of the hladder suggests tuherculous ulcerations. Palpation of the abdomen shows a mass on the right side, which is an apparently enlarged kidney On the left side nothing can he felt corresponding to the kidney x-Ray, however, shows kidney outlines on hoth sides Vaginally, hoth ureters are very much thickened and tender The case looks like a hopeless one, but every once in awhile one finds that under spinal anesthesia one can save such a heing The preoperative diagnosis is indefinite The patient surely has a one-sided renal tuberculosis The second side may be tubercular, but it may be an obstructed, infected hydronephrosis. If it is the latter and we can drain the kidney successfully, we may be able to save the patient's life It is in these desperate cases that I always use spinal anesthesia, as it in no way interferes with the kidney function

[1] December 6th. Patient discharged well

The patient, as you see, is placed on her abdomen, having been injected with 6 c c of 1 per cent novocain solution in the lower lumbar spine The head is kept elevated about the level of the lumbar region, and after ten minutes the anesthesia is sufficiently complete to allow of my exploring both kidneys The right kidney will be exposed first by a vertical oblique incision As you see, as soon as we get through the musculature down to the kidney we find a large sacculated tuberculous organ Some of the saccules contain thin pus and others putty like material To confirm the diagnosis a specimen is excised from this side [1]

As this right kidney is completely destroyed, having opened numerous pus pockets a packing is introduced into these pockets and the left kidney is rapidly exposed in the same way On cutting through the abdominal wall the first thing that we encounter is this enormous dilated, moderately thickened ureter The kidney itself feels, although it is not to be delivered, as if it had some functional parenchyma Consequently, all we shall do is to make a hole into the ureter opposite the pelvis and introduce a tube into the ureter for drainage purposes At the end of the operation, the wound being left open, the patient will be transfused and if sufficient parenchyma remains in the left kidney, the patient should come out of her uremic condition, and when she improves sufficiently the right kidney may be removed, if necessary

The patient has stood the operation very well and experience has shown that if function picks up the patients of this type can occasionally make very satisfactory convalescences [2]

It is interesting that in this particular case repeated search for tubercle bacilli in the urine was negative The urine draining from the left kindey has been repeatedly examined for tubercle bacilli and was also negative It would seem, therefore, that in view of the fact that the right kidney has proved definitely

[1] Pathologic report tuberculosis

[2] December 5th Patient s blood chemistry rapidly went back to normal and patient passed out of her uremic condition vomiting ceased and a slow but satisfactory convalescence is in progress

to be a tubercular organ the left kidney may be an obstructed, infected hydronephrotic organ of non-tubercular character. Experience has shown in these cases that under spinal anesthesia some of the most hopeless derelicts can be saved. Under general anesthesia a patient like this would have absolutely no chance. Up to date, having used spinal anesthesia in these bad kidney risks for seventeen years, I have fortunately not seen any bad results from this anesthesia.

MEMORIAL HOSPITAL

CLINIC OF DR WILLIAM B COLEY

SARCOMA OF THE LONG BONES

I AM sorry that time will not permit me to discuss at length the question of the diagnosis of tumors of the long bones, and yet, before showing the cases I should like to give you a few of the more important points on the diagnosis It is most essential to obtain a very complete history of the case with special reference to the following points the age of the patient, the duration of the disease whether pain or swelling was the first symptom, whether or not there was any antecedent injury, the location of the tumor, the presence or absence of local temperature and the color and appearance of the skin as regards dilatation of the superficial veins

Trauma —Gross found antecedent trauma present in almost 50 per cent of the cases, and our own series covering nearly 300 cases, shows a little less percentage, around 40 The antecedent injury may have occurred a few days to a few months before the appearance of the tumor, sometimes a longer period of time elapses The site of an old or recent fracture plays an important part in some cases In 50 cases of giant cell sarcoma there was a history of antecedent trauma in 56 per cent

Pain —In malignant osteogenic long bone sarcoma the first and most important symptom is pain Pain may have existed for several weeks before the x ray pictures or physical examination show any evidence of disease Persistent pain in a long bone in a young healthy adult must be looked upon as something that requires careful watching We had one case admitted to the Hospital for Ruptured and Crippled complaining of pain in the hip One of our best orthopedic surgeons could find no evidence of any trouble and the x ray examination was

negative. The patient came back two weeks later still complaining of pain; this had persisted and had become more intense. A second series of *x*-ray photographs proved negative. Shortly after a tumor appeared, which proved to be a very rapidly growing periosteal sarcoma About three weeks later, when he was admitted to my service at the Memorial Hospital, he had a huge inoperable tumor which increased in size in spite of palliative treatment This illustrates very well the importance of recognizing severe and persistent pain as an early symptom in long-bone sarcoma, and also is a striking example of the extreme *malignancy of some of these tumors*

Location.—Sarcoma usually occurs in the diaphysis of the bone in the neighborhood of one of the ends, but almost never in the joint; while tuberculosis occurs in the epiphysis and quickly involves the joint In sarcoma the joint is involved only in the later stages of the disease, about one-fourth begin in the shaft of the bones some distance from the ends

***x*-Ray Examination.**—The *x*-rays and clinical history enable us to make a positive diagnosis in the majority of cases, particularly in the central tumors In a considerable number of cases, probably 25 per cent., we cannot make a positive diagnosis in the early stages of sarcoma of the long bones on clinical and *x*-ray evidence alone

Exploratory Operation.—A great many pathologists believe that exploratory operation is a dangerous procedure, and should not be performed because of the risk of infection, or of a large fungating sinus remaining at the site of the exploration. I have discussed the question of the advantages and disadvantages of exploratory operation in bone tumors at considerable length in my paper on *Prognosis in Giant-cell Sarcoma of the Long Bones* (Annals of Surgery, March and April, 1924). While I do not believe that exploratory operation or biopsy should be performed as a routine measure, I do believe that in many cases the advantages of exploratory operation far outweigh the disadvantages. The exploration should be done only by the man who is going to take care of the patient afterward; it is not wise for the tumor to be cut into by the family physician or by the

surgeon in charge of a small hospital, who is not going to care for the patient afterward and who has had little experience in the diagnosis and treatment of long bone tumors

Early diagnosis is of the greatest importance if we hope to save the patient

CASE I. PERIOSTEAL OSTEOGENIC SARCOMA OF THE TIBIA WITH EXTENSIVE INOPERABLE METASTASES IN THE FEMORAL, INGUINAL AND ILIAC GLANDS COMPLETE RECOVERY UNDER TOXIN AND RADIUM TREATMENT LIMB SAVED PATIENT WELL SEVEN AND A HALF YEARS LATER

Mr S the patient whom I first present is one of the few cases on record of a periosteal osteogenic sarcoma with metastases that has been cured by any method of treatment, and it has been included in the Codman Bone Registry as one of the 13 cases up to October 1924 of periosteal sarcoma in which the clinical *x* ray and microscopic diagnosis has been passed upon by the committee that has remained well for five years This patient was referred to me by Dr John H Gibbon of Philadelphia, in March 1917 with a history of a rapidly growing tumor of the shaft of the left tibia of six weeks' duration Doctor Gibbon and other surgeons who had seen it regarded it as periosteal sarcoma I concurred in the diagnosis but in order to be sure I did an exploratory operation removing a piece of the tumor, which I turned over to Doctor Ewing for examination and which he pronounced a definite highly malignant osteogenic sarcoma I decided that it was worth while trying to save the limb rather than to do an immediate amputation Accordingly, I put him on injections of the mixed toxins of erysipelas and Bacillus prodigiosus combined with radium treatment He had a total of 46 720 mc hours of radium over the tibia from May 1st to June 19th The toxins were continued at home by his physician Dr R G Gamble The patient came to see me in the middle of August and asked my permission to go to the seashore for a month, inasmuch as I could find no evidence of the disease remaining I believed it to be safe to discontinue the toxins for a few weeks without harm He again came to me in the

early part of October, at which time examination showed extensive metastases in the inguinal, femoral, and iliac glands, some of them an inch or more in diameter. I gave a hopeless prognosis to his physician, but thought it worth while continuing treatment. The radium pack was applied over the glands of

Fig 62.—Case I Original picture, periosteal sarcoma of tibia with metastases treated with toxins and radium, limb saved, patient well seven and a half years later

the groin on three occasions, *i. e.*, 18,000 mc. hours in October; 17,270 mc. hours in November, and 12,000 mc. hours in December. At the same time the toxins were resumed and kept up, with occasional intervals of rest for two and a half years, in doses not sufficient to interfere with his daily routine of life. The recurrence which had taken place at the end of five months'

treatment made me feel that it would be unwise to stop the treatment too soon; and for this reason I continued it much longer than usual. The patient today is in perfect health, seven and a half years later. The *x*-ray pictures show no evidence of disease in the bone. I think this case illustrates very well the importance of exploratory operation. Had I not performed such an operation, and were I unable to present microscopic slides of the specimens, I am perfectly certain that the correctness of the diagnosis would be questioned, and I should be unable to convince anyone that a periosteal osteogenic sarcoma of the long bones involving 6 inches of the shaft of the tibia with definite inoperable metastases had been cured by any method of treatment As two agents were used in the treatment of this case it is impossible to definitely state which one was responsible for the cure. I believe that the result was due, probably, to a combination of the local action of the radium and the systemic action of the mixed toxins. I doubt very much if the patient could have been cured by either agent alone. I will show you lantern slides of the original tumor together with microphotographs of the sections.

CASE II. PERIOSTEAL OSTEOGENIC SARCOMA OF THE FIBULA WITH METASTASES IN THE GROIN, ILIAC FOSSA, AND LUNGS; AMPUTATION; TOXINS; RADIUM; PATIENT WELL FOUR AND A HALF YEARS LATER

H. S. This case is almost of equal interest to the preceding one, although it has not yet passed the five-year limit. Here we have a boy with a very rapidly growing sarcoma involving about two-thirds of the shaft of the right fibula. The tumor was of three months' duration when I first saw the case in consultation with Dr. Royal Whitman at the Hospital for Ruptured and Crippled, in the latter part of May, 1920. Physical examination showed a very large tumor fungating extensively at the site of the exploratory incision made a few weeks before. The glands in the groin were markedly enlarged. In view of the very large size of the tumor and its rapid growth I advised an immediate amputation, to be followed by toxin treatment.

early part of October, at which time examination showed extensive metastases in the inguinal, femoral, and iliac glands, some of them an inch or more in diameter. I gave a hopeless prognosis to his physician, but thought it worth while continuing treatment. The radium pack was applied over the glands of

Fig 62.—Case I. Original picture, periosteal sarcoma of tibia with metastases treated with toxins and radium, limb saved, patient well seven and a half years later

the groin on three occasions, *i. e.*, 18,000 mc. hours in October; 17,270 mc. hours in November, and 12,000 mc. hours in December. At the same time the toxins were resumed and kept up, with occasional intervals of rest for two and a half years, in doses not sufficient to interfere with his daily routine of life. The recurrence which had taken place at the end of five months'

Fig 63.—Case III Endothelioma of clavicle Two months' duration

Fig 64.—Case III

differed greatly in its response to the same treatment. I am very sorry that I cannot show you the patient herself. This

CASE IV. LARGE OSTEOGENIC SARCOMA OF THE UPPER END OF THE HUMERUS FOLLOWING A RECENT TRAUMA; TOXINS AND RADIUM

E. M. This patient is an example of what might be called a borderline case between an operable and inoperable stage This man was referred to me by Doctors Sheehan and Deaver, of Philadelphia, on July 24, 1924. About a year and a half ago he broke his arm One year later a tumor developed at the site of the injury, and when I first saw him the measure-

Fig 67.—Case IV. Osteogenic sarcoma of humerus before treatment was begun, following fracture.

ment over the axilla and tip of the clavicle was 21 inches, while the circumference at the highest point of the axilla was 15 inches. It was one of those cases in which it was difficult to decide whether or not to do a shoulder-joint amputation. The *x*-ray and clinical evidence was so clear that it was possible to make a definite diagnosis without a biopsy In these humerus cases in which there is a periosteal tumor with considerable new bone formation, if amputation is practical, I believe amputation followed by toxin to be the method of choice, as one rarely gets much effect from

radium, the *x*-rays, or toxins, and there is risk of metastases developing if amputation is delayed too long. Some of the surgeons who saw this case believed it to be inoperable; so under the circumstances I thought it wise to try conservative treatment. He was given a massive dose of radium, 10,000 mc. hours at 7 cm. distance over three different areas, and the toxins were kept up three or four times a week. The tumor diminished 5 inches in circumference in the short period of about four weeks.

Fig. 68.—Case IV. Three weeks later.

The patient regained his lost weight and is feeling perfectly well at the present time. He is still getting the mixed toxins twice a week; his highest temperature, 104.5° F., was produced by a very small dose, showing his extreme susceptibility to the toxins.

In this case I returned to my earlier method of treatment, making the injections directly into the tumor instead of systemically, as I have been doing in the majority of cases. For the local injections only very small doses are used, beginning with 1/8 minim and working up very gradually. This patient was

able to stand 1 minim into the tumor before his temperature rose to 104° F. I believe that, perhaps, the best results are obtained by alternating the local with systemic injections. I will show you *x*-ray pictures of this case taken at different stages—before, during, and after the treatment. December 1, 1924 examination shows slight increase in size, and *x*-ray shows renewed activity of tumor. Another radium treatment was given, if no improvement is noted amputation is advised

Later Note.—A massive dose of radium was applied both anteriorly and posteriorly during December, 1924 and January, 1925 The arm has returned to nearly normal size and the slight pain and disability have disappeared The ultimate result is doubtful.

CASE V. SARCOMA OF THE HUMERUS, TELANGIECTATIC; NOT CONTROLLED BY *x*-RAY TREATMENT; AMPUTATION BY DR. B. L. COLEY; NO PROPHYLACTIC TREATMENT AFTERWARD

I R This is a case which Doctor Ewing classifies as telangiectatic, a highly malignant central tumor, and comparatively rare Greenough and Harmer, in their review of 43 cases of osteogenic sarcoma observed at the Massachusetts General Hospital during a period of the last ten years, failed to find a single example of this type This boy was admitted to the Memorial Hospital on April 10, 1922, and was treated for about four months by Dr Herendeen with high voltage *x*-rays; the tumor continued to increase in size during treatment, and amputation was performed on December 7, 1922 by Dr Bradley L Coley. The boy is in good health at the present time, two years later, and a recent *x*-ray picture shows the lungs are entirely free of metastases.

It is possible that the *x*-ray treatment, while it did not control the growth of the sarcoma, nevertheless had produced certain changes which tended to inhibit the growth or the development of metastases If this is true, then the cases in which amputation has been performed after prolonged radiation, as in this case, should show better end-results than the cases in which amputation is performed

without previous *x* rays or radium treatment The data at present available at the Memorial Hospital, I believe, are not sufficient to warrant any definite conclusion upon this point We have had a series of 19 cases in which *x* rays or radium had been used, and later the cases went on to amputation, only one of these has remained well more than three years This was a case of typical periosteal sarcoma without involvement of the bone, it was treated for four or five months, with radium by Dr Quick, without controlling the disease He then amputated at the lower end of the femur, the patient had no prophylactic treatment after, and Quick reports that she is still well three years later

I now show you a specimen taken from the patient just presented, also *x* ray pictures, and lantern slides

CASE VI PERIOSTEAL SARCOMA OF THE FEMUR; LOCAL EXCISION; RECURRENCE, TOXINS, TEMPORARY IMPROVEMENT, AMPUTATION AT HIP JOINT, PROLONGED TOXINS PATIENT ALIVE AND WELL FIFTEEN YEARS LATER

H J This patient was operated upon by Dr John A Hartwell at the Presbyterian Hospital in October, 1909, there was a prompt recurrence In December, 1909 he was referred to me by Dr Joseph A Blake, in the hope of saving the limb by toxins, under this treatment there was slight temporary improvement, but a recurrence later took place, and I advised immediate hip joint amputation which was performed by Dr Blake on December 23 1909 The patient was again referred to me by Dr Blake and received two periods of prophylactic toxin treatment at the Memorial Hospital during the winter and spring I lost sight of him for many years, and put him down on my list as dead Recently, through the courtesy of Dr Whipple of the Presbyterian Hospital, I secured the patient's address, and have the opportunity of showing him to you today perfectly well, fifteen years this coming December He has been registered in the Bone Sarcoma Registry under Presbyterian Hospital Cases

It is interesting to note that McWhorter and MacGuire (Archives of Surgery, November, 1924), in their review of 50

cases of sarcoma of the long bones observed at the Presbyterian and Bellevue Hospitals, found this to be the only case of periosteal or subperiosteal sarcoma, out of a total group of 17 cases, alive and well more than five years In describing the case which I have just presented they state that he received *x*-ray and toxin treatment, but this is an error, as he received only toxin treatment before and after amputation

CASE VII. PERIOSTEAL SARCOMA OF THE METATARSAL BONE

A. G This boy, a patient of Dr. Douglas Quick, came to the Memorial Hospital for treatment of a tumor of the foot; there was a secondary infection, with a great deal of swelling, edema, and redness, which made the diagnosis doubtful for several weeks It was thought by some that there might be a foreign body in the foot, and others thought that there might be a tumor. Five years before the patient had stepped on a rusty nail which had entered the foot for about 2 inches He had been operated upon at St Elizabeth's Hospital in November, 1923, for a tumor of the foot. A biopsy was performed and the report on this specimen, together with the infection, led us to believe that amputation was the best course to follow, previous to the amputation the radium pack had been applied to the foot. Amputation was performed by Dr Bradley L. Coley in January, 1924 *A point of interest in this boy's* postoperative history is that twenty-four hours after the amputation he developed a high temperature and pulse and had all the signs of a very acute infection, we dressed the wound immediately and noticed a little puffiness about the suture line and some tension of the flap; on cutting the sutures several bubbles of gas escaped Bacillus welchii antitoxic serum was used, finally his temperature and pulse returned to normal Of course the wound had to be thrown wide open and there is still an area of about $\frac{1}{4}$ inch which has remained unhealed. Dr. Ewing's diagnosis following the amputation was endothelioma, probably originating in one of the tarsal bones

Metatarsal and metacarpal sarcomas are extremely rare The first case which awakened my interest in sarcoma was a

periosteal round-cell sarcoma of the metacarpal bone, following an injury, in 1890; the patient a perfectly healthy young adult. Electric treatment was given for two or three weeks. When she came to me I was uncertain as to the nature of the trouble, and removed a specimen, which, on microscopic examination, proved to be round-cell sarcoma. Dr William T. Bull, who saw the case in consultation with me, advised immediate amputation, which I performed the following day. However, in six weeks metastases developed in both breasts as well as all over the body, and she died in four weeks. This shows the extreme rapidity of these growths.

CASE VIII. PERIOSTEAL SARCOMA OF THE FEMUR FOLLOWING A RECENT TRAUMA; *x*-RAY TREATMENT; AMPUTATION; TOXIN TREATMENT; WELL AT PRESENT

J L. This young man struck his leg against a desk in September, 1923; some pain followed, which gradually disappeared.

Fig 69.—Case VIII Sarcoma of lower end of femur, early stage, following recent trauma

Fig 70.—Case VIII Six weeks later

In January, 1924 he noticed a growth. On admission to the Memorial Hospital, in the latter part of February, 1924, it was decided to treat him with high voltage *x*-rays. The *x*-ray picture showed a periosteal osteogenic sarcoma with little bone production—a type which Gross classified as subperiosteal sarcoma. After about two or three months' treatment with the *x*-rays, during which time the growth showed no further diminution in size and the pain had returned, it was decided unsafe to delay amputation any longer; and the leg was removed just below the hip on May 20, 1924. Microscopic examination by Dr. Ewing, who pronounced it an osteogenic sarcoma; large spindle- and small giant-cell type. The toxins, which were begun immediately after the amputation, have been kept up; and the patient, as you see, is in good health at the present time. (Patient is well February, 1925.)

CASE IX. LARGE INOPERABLE PERIOSTEAL SARCOMA OF THE UPPER PORTION OF THE FEMUR FOLLOWING A FRACTURE; DISAPPEARANCE UNDER COMBINED TOXINS AND RADIUM TREATMENT; REUNION OF PATHOLOGIC FRACTURE; WELL AT PRESENT, SEVEN YEARS LATER

R. H. Here is an even more remarkable case, perhaps, than the first one. This man was referred to me by Dr. L. Fischer, of the Lenox Hill Hospital, in October, 1917; he had had a fracture below the trochanter, following a fall on the ice in January, 1917. The *x*-ray picture showed no pathologic condition. He was under the care of Dr. George Howley, of Bridgeport, Conn., at St. Vincent's Hospital for twenty-seven weeks, a tumor was noticed nine weeks after the fracture. At the time of his admission to the hospital (October, 1917) he had a very large tumor involving the upper half of the shaft of the femur, the circumference of which was 67 cm.; the circumference of the other thigh was 40 cm.; there was a pathologic fracture, and the condition was far beyond hip-joint amputation; 5 inches of the shaft had been destroyed. *x*-Ray picture showed probable metastases of the lungs. From 1917 to June, 1918 he received local and systemic injections of

Fig. 71.—Case IX. Inoperable periosteal sarcoma of femur before treatment was begun

Fig. 72.—Case IX. One and a half years after toxin and radium treatment was begun

the mixed toxins, and the radium pack (about 40,000 mc. at 10 cm. distance) was applied in November and again in December. The circumference of the leg diminished 8 cm.; there was some union of the pathologic fracture, the *x*-ray of the chest was negative. A Thomas splint was applied, and the patient returned home. He is now perfectly well seven years later, and is able to walk about without a crutch or cane; the only thing he has to wear is an orthopedic shoe on account of the 5 inches shortening caused by the complete destruction of the bone.

Fig. 73.—Case IX. Five and a half years after treatment.

Note.—I have only a lantern slide and *x*-ray picture taken before treatment, and regret that it cannot be shown with the later illustrations. While no biopsy was made, the *x*-ray and clinical evidence leave little doubt that we were dealing with a malignant type of sarcoma of the femur, probably of the round-cell endothelioma type.

CASE X. CENTRAL SARCOMA OF LOWER END OF FEMUR; GIANT- AND SPINDLE-CELL; EXTENSIVE INVOLVEMENT OF KNEE-JOINT; TOXIN TREATMENT; RECOVERY; LIMB SAVED; WELL TEN YEARS LATER

L. G. Female, nineteen years old. This patient was admitted to the Hospital for Ruptured and Crippled in October, 1914, with a history of having had a swelling of the lower end of the femur for about four or five months. She had been treated at various hospitals for tuberculosis; and a plaster splint had been applied. She was referred to me by Dr. V. P. Gibney in 1914. Exploratory operation was performed, revealing complete destruction of the lower end of the femur with extensive involvement of the knee-joint; a specimen was removed; but no attempt was made to curet the large tumor.

Microscopic examination by Dr. F. M. Jeffries, pathologist to the Hospital for Ruptured and Crippled, mixed-celled sarcoma; by Dr. Francis Carter Wood, malignant giant- and spindle-cell central sarcoma; by Dr. James Ewing, giant- and spindle-cell sarcoma. "The tumor is not histologically benign; I merely mean it is not extremely malignant." This tumor has been classed as benign giant-cell sarcoma in the Codman Bone Registry.

The patient was put upon the mixed toxins of erysipelas and Bacillus prodigiosus, which treatment was kept up for nearly a year. She made a complete recovery, the sinus closed, and she has remained in good health for ten years since the treatment was begun She walks without support of any kind, and a thick-soled shoe equalizes the 2 inches of shortening.

The recent developments in this case are extremely interesting: a tumor appeared in the right breast a year ago, and clinically was diagnosed as fibro-adenoma. A local operation was performed and the diagnosis confirmed by microscopic examination. About four months ago she developed another tumor in the same breast at the site of the old scar. This grew somewhat more rapidly than the previous one, and about a month ago a small nodule, the size of a cherry, appeared 1 inch above the main tumor and separate from it. The smaller tumor was firm in consistence, but not hard; the larger one was soft in consist-

ence, apparently cystic, and resembled a cystadenoma. I intend to remove the tumors during the coming week.[1]

CASE XI. TUMOR OF LOWER END OF RADIUS; COMPLETE DESTRUCTION OF THE LOWER TWO INCHES; CLINICAL AND *x*-RAY DIAGNOSIS; TOXIN TREATMENT; RECOVERY; WELL OVER SIX YEARS

L. D. G., male, was admitted to the Hospital for Ruptured and Crippled on April 25, 1918, there was complete destruction of the lower 3 inches of the radius; the tumor had broken through the outer shell of the bone, pathologic fracture. Amputation had been advised by other surgeons. He was referred to me by Dr. V. P. Gibney, and I decided to try the toxins in his case without biopsy or any other treatment. At the end of three months the tumor had entirely disappeared, regeneration of bone took place, and restoration of function. The patient is in excellent condition at the present time, six years or more later.

Here the clinical and *x*-ray diagnosis was central sarcoma of the radius, probably giant-cell sarcoma. It had progressed so far, however, that the bony shell had been entirely destroyed. The toxin injections were all systemic and given in the buttocks.

CASE XII. CENTRAL SARCOMA OF UPPER END OF TIBIA, GIANT- AND SPINDLE-CELL; CURETTAGE, TOXINS, AND RADIUM; RECOVERY; LIMB SAVED; WELL OVER NINE YEARS

C. F., female, was admitted to the Hospital for Ruptured and Crippled in August, 1915, with a tumor of six months' duration,

[1] The tumors were removed one week after the presentation of the patient at the clinic. Both tumors proved to be malignant. It was extremely difficult to classify it. The three pathologists who examined it (Drs. Jeffries, Ewing, and Wood) were in doubt, but after careful examination of several sections Dr. Jeffries pronounced it a sarcoma, and Doctors Ewing and Wood classed it as a carcinoma. The macroscopic appearance of the tumor and the rapid growth inclined me to regard it, clinically, as a sarcoma, and her early age, twenty-seven years, likewise favored that diagnosis. However, in deference to the authoritative opinions of Dr. Ewing and Dr. Wood, we must regard this case as a carcinoma, and another example of a rare condition, *i. e.*, two different types of malignant tumor developing in the same individual after a long interval of time.

which had destroyed the upper 5 inches of the tibia, pathologic fracture, the joint was not involved Amputation had been strongly advised by Dr Royal Whitman who believed that if the disease were entirely eradicated by conservative treatment the limb would be of little use anyway The patient was referred to me by Dr V P Gibney, and it was decided that it would be worth while giving her the benefit of a trial of conservative treatment Under ether anesthesia I curetted the upper 5 inches of the tibia the tumor had not invaded the knee joint, only a thin layer of cartilage remained The whole limb was put in a plaster cast, and the wound was dressed through a window, there was no infection The toxins were begun a few days after the operation and kept up until January The sinus had entirely closed and there was no evidence of the tumor In January she had an attack of grip and the toxins were discontinued for about a month At the end of this time a local recurrence took place, which increased rapidly in size, a second curettage was performed, followed by an immediate recurrence, there was a large fungating tumor projecting beyond the normal surface A radium pack 10 000 mc hr was applied at 6 cm distance, and the toxins were begun again and kept up for a number of months There was no further return of the tumor

The x ray pictures which I present, taken two and five years later, show the complete regeneration of the destroyed portion of the tibia, with complete restoration of function The patient now walks about without support of any kind, she has a perfectly useful limb It is now nine years later In this case a microscopic examination was made by several pathologists Dr Jeffries reported giant cell sarcoma, Dr Ewing, giant cell of the epulis type, very moderate degree of malignancy, Dr George Barrie, fibrosarcoma, malignant, Dr MacCarty (of the Mayo Clinic) malignant mixed cell sarcoma

This tumor is classed as a benign giant cell sarcoma in the Codman Registry

CASE XIII. GIANT-CELL SARCOMA OF LOWER END OF RADIUS; CURETTAGE AND CARBOLIC ACID; IMMEDIATE RECURRENCE; TOXINS; DISAPPEARANCE OF TUMOR; TWO MONTHS LATER RECURRENCE; HEAVY RADIUM TREATMENT FOR FOUR MONTHS WITH STEADY INCREASE IN SIZE AND LOSS OF BONY SHELL; TOXINS; COMPLETE DISAPPEARANCE; REGENERATION OF BONE; PATIENT WELL FIVE YEARS LATER

M. F., female, was admitted to the Hospital for Ruptured and Crippled on November 28, 1919, with a tumor of the right radius, of four months' duration This was curetted and the cavity swabbed out with carbolic acid A recurrence took place within two months The toxins were begun and kept up for six weeks, the tumor disappeared, but recurred again a little over two months later. The patient was then treated with massive doses of radium for four months There was steady increase in size of the tumor, without new bone formation, and complete loss of the bony shell, and in November, 1920, an amputation was considered. I decided to give the toxins a further trial; the radium was discontinued, and the toxin treatment was kept up for four months at the Hospital for Ruptured and Crippled There was immediate and steady improvement, with replacement of tumor with new bone The patient is in good health at present, with complete restoration of function, nearly five years later.

CASE XIV. PERIOSTEAL SARCOMA OF LOWER END OF FEMUR; RADIUM; NO EFFECT; TOXINS AND RADIUM COMBINED; NO EFFECT; AMPUTATION, FOLLOWED BY TOXINS; PATIENT WELL SEVEN AND A HALF YEARS LATER

Mrs. W P. The patient whom I now present was treated with radium by Doctors Burnam and Kelly for several months, with little effect in controlling the growth. She was referred to me by Dr J M. T. Finney in January, 1917, and was treated with toxins and radium combined for five months, without result. I then amputated the limb on July 6. 1917, following this with prophylactic toxin treatment. The patient has remained well and you see her at the present time in the best of health. Microscopic examination was made by Dr. Ewing:

Periosteal osteogenic sarcoma, sclerosing type. This case has been registered in the Codman Bone Registry

CASE XV. PERIOSTEAL OSTEOGENIC SARCOMA OF THE UPPER END OF HUMERUS; RADIUM; *x*-RAYS; TOXINS; RECENT CASE

This case is of special interest, as it illustrates the difficulty of making an early diagnosis in a case of long-bone sarcoma, especially of the upper end of the humerus

Fig 74.—Case XV Periosteal osteogenic sarcoma of upper end of humerus before treatment was begun

L B., female, first noticed slight pain in the region of the right shoulder and inability to abduct right arm five months ago. The pain and disability gradually increased. At about the end of four months she came to the Out-patient Department of the Hospital for Ruptured and Crippled and a diagnosis of

CASE XIII. GIANT-CELL SARCOMA OF LOWER END OF RADIUS; CURETTAGE AND CARBOLIC ACID; IMMEDIATE RECURRENCE; TOXINS; DISAPPEARANCE OF TUMOR; TWO MONTHS LATER RECURRENCE; HEAVY RADIUM TREATMENT FOR FOUR MONTHS WITH STEADY INCREASE IN SIZE AND LOSS OF BONY SHELL; TOXINS; COMPLETE DISAPPEARANCE; REGENERATION OF BONE; PATIENT WELL FIVE YEARS LATER

M. F., female, was admitted to the Hospital for Ruptured and Crippled on November 28, 1919, with a tumor of the right radius, of four months' duration. This was curetted and the cavity swabbed out with carbolic acid A recurrence took place within two months The toxins were begun and kept up for six weeks; the tumor disappeared, but recurred again a little over two months later. The patient was then treated with massive doses of radium for four months There was steady increase in size of the tumor, without new bone formation, and complete loss of the bony shell; and in November, 1920, an amputation was considered I decided to give the toxins a further trial; the radium was discontinued, and the toxin treatment was kept up for four months at the Hospital for Ruptured and Crippled. There was immediate and steady improvement, with replacement of tumor with new bone The patient is in good health at present, with complete restoration of function, nearly five years later

CASE XIV. PERIOSTEAL SARCOMA OF LOWER END OF FEMUR; RADIUM; NO EFFECT; TOXINS AND RADIUM COMBINED; NO EFFECT; AMPUTATION, FOLLOWED BY TOXINS; PATIENT WELL SEVEN AND A HALF YEARS LATER

Mrs. W. P. The patient whom I now present was treated with radium by Doctors Burnam and Kelly for several months, with little effect in controlling the growth. She was referred to me by Dr J. M. T. Finney in January, 1917, and was treated with toxins and radium combined for five months, without result. I then amputated the limb on July 6, 1917, following this with prophylactic toxin treatment. The patient has remained well and you see her at the present time in the best of health Microscopic examination was made by Dr. Ewing:

with more or less infiltration of the soft parts, resection seemed out of the question In my opinion amputation followed by the use of the toxins offered the only reasonable hope of saving the patient's life and this course was strongly advocated The patient had been recently married and was two months' pregnant, and refused to consider amputation She was treated with massive doses of radium combined with *x* rays, and the toxins At the end of one month the tumor apparently entirely disappeared and she regained her lost weight In the early part of October the swelling reappeared and increased in size The patient was given further *x* ray treatment In view of the fact that she was six months' pregnant it seemed inadvisable to resume the toxins for fear the marked reactions might result in a miscarriage [1]

Later Note (February 11, 1925)—Three weeks ago the patient gave birth to a healthy infant She was unable to have treatment during the last week of pregnancy The tumor has increased 1 inch in size since November, and the pain has become much more severe *x* Ray examination of the lungs shows no evidence of metastasis She has recently developed pain in the other humerus but she still refuses amputation

CASE XVI. PERIOSTEAL SARCOMA OF FIBULA *x* RAYS NO EFFECT; AMPUTATION; RECENT CASE

C W This patient is still in the hospital, I am presenting her chiefly for the purpose of illustrating certain points in the diagnosis of long bone sarcoma especially as regards the rapidity of these growths In May 1924 this young girl noticed slight pain just below the left knee, there was no swelling until two or three weeks later, the pain continued and became more severe She consulted a physician, who treated her for a sprain, although she had had no history of injury Various diagnoses were made by other physicians In the latter part of September, 1924 she went to the Greenpoint Hospital, where an *x* ray picture

[1] November 5th under radiation the tumor has nearly disappeared and there is no evidence of lung metastases I have no idea that the patient will be cured by conservative treatment and I doubt if amputation at this late date will save her life

was made and trouble pronounced a tumor; she was then referred to the Memorial Hospital. Physical examination on admittance showed the patient to be in fairly good general condition; some loss of weight; and marked atrophy of all the muscles of the left thigh There was a large, fusiform tumor occupying the upper half of the left leg extending nearly to the knee-joint, but not involving it, measuring 30 cm. in length and 40 cm. at the largest circumference; the skin was shiny,

Fig 76.—Case XVI. Periosteal sarcoma of fibula before x-ray treatment was begun

and there was dilatation of the superficial veins. The tumor itself was moderately firm in consistence, but not of bony hardness. The knee-joint itself was not involved. She has had *x*-ray treatments during the last three weeks, and I shall do an amputation at the thigh in a few days.[1]

[1] An amputation was performed October 24, 1924, the tumor proved to be a very extensive periosteal osteogenic sarcoma It is interesting to

Giant-cell Sarcoma.—We have at present a number of cases (upward of 25) of giant-cell sarcoma of the benign type which have shown very marked improvement under

Fig. 77.—Case XVI. Periosteal sarcoma of fibula before x-ray treatment was begun; case later went on to amputation.

x-ray treatment given by Dr. Herendeen. Some of these patients have gone nearly two years with the disease under

---

note that the femoral vein, at the site of the amputation in the midthigh showed a thrombus made up largely of sarcoma cells. The patient was [illegible] upon prophylactic treatment, i. e., the mixed toxins systemically, and x-ray over the chest. Examination February 11, 1925, showed no local recu and lungs clear.

apparent complete control One patient with a central sarcoma of the lower end of the femur (clinical and *x*-ray diagnosis: giant-cell sarcoma) treated with radium by Dr. Quick is well now two and a half years, he received 98,000 mc. hours of radium emanations in the form of a pack, between March and September, 1922, since which time he has had no further treatment. A recent examination shows considerable re-formation of bone, no extension of the tumor; and, aside from a rather severe local dermatitis, his condition is excellent. We have two other cases, a femur and a tibia, treated with radium after curettage and carbolic acid, that have remained well for more than four years These cases, together with others still under treatment, show that radium and *x*-rays both have a very marked beneficial effect on giant-cell sarcoma, in some instances resulting in a permanent cure Whether or not this method will prove more satisfactory than early curettage followed by toxins alone or toxins combined with radium it is impossible to say. At present we are inclined to regard the latter method as the more satisfactory one A thorough discussion of the subject will be found in my paper on *Prognosis in Giant-cell Sarcoma of the Long Bones* (Annals of Surgery, March and April, 1924).

Practically all central sarcomas, certainly all the giant cell group, should be treated conservatively.

In regard to the treatment of periosteal osteogenic sarcoma of the long bones by radium or *x*-rays: These tumors have proved much more resistant to radiation than the giant-cell group During the last eight years 60 cases of periosteal sarcoma including the endothelioma cases in the operable stage—that is, not beyond amputation—have been treated at the Memorial Hospital, so far our results have not been such as to encourage us to believe that many of these cases can be permanently cured by radiation In the endothelioma group both *x*-rays and radium and toxins have a very marked effect, often causing an almost complete disappearance of the tumor within a few weeks. In this group of cases we believe that it is justifiable to try conservative treatment for a short period in the hope of saving the limb. Unfortunately, in most cases, the disease

recurs at varying intervals either locally or in the form of metastases which are prone to occur in other bones In the larger group of osteogenic sarcomas characterized by considerable formation of new bone or cartilage neither *x* rays nor radium have a very marked or prolonged effect In this group of cases my personal feeling is that early amputation followed by prolonged systemic treatment with the mixed toxins of erysipelas and Bacillus prodigiosus offers the best chance of saving the life of the patient While amputation alone has shown few permanent cures, my own series of 34 consecutive cases of periosteal sarcoma treated by amputation and toxins, show 17, or 50 per cent, well from three to twenty eight years Our end results in 160 cases of operable periosteal sarcoma treated by various methods will be published shortly elsewhere

SURGICAL CLINIC OF THE NEW YORK NEUROLOGICAL INSTITUTE (Dr Elsberg)

Clinic by Dr Charles A Elsberg

TUMOR OF THE SPINAL CORD; LAMINECTOMY; REMOVAL

History.—The patient whom I am about to operate upon is a married woman, forty five years of age, who had always been in good health up to August 1921, when she began to suffer from sharp shooting pain in the upper part of her neck on her right side

The pain was increased by coughing, sneezing, or straining at stool, and was accompanied by a feeling of stiffness of the neck She soon noticed that the power of the right upper extremity was not as good as it had been, and from that time up to the present the strength of the arm has slowly become diminished Six months ago she began to drag the right lower limb and the diminution in power soon became so marked that the limb would sometimes give way under her, so that she fell to the ground About ten months ago she began to have a burning sensation in the left thigh and leg, and sometimes in the left upper limb and left side of the chest For the past eighteen months she has had increased frequency of urination

All of the symptoms have slowly but steadily grown worse up to the time of her admission to the hospital

Physical Examination —There is no disturbance of any of the cranial nerves

Power The patient is a well nourished woman who walks with a typical hemiplegic gait with her right upper limb held in a hemiplegic attitude She is barely able to lift the right foot from the bed when recumbent

There is a marked weakness of the right upper and lower limbs

Reflexes: In the left upper and lower limbs the tendon reflexes are normally active, while those on the right side are all markedly exaggerated; there is transient ankle-clonus on the right, with right Babinski and Chaddock reflexes The abdominal reflexes cannot be elicited

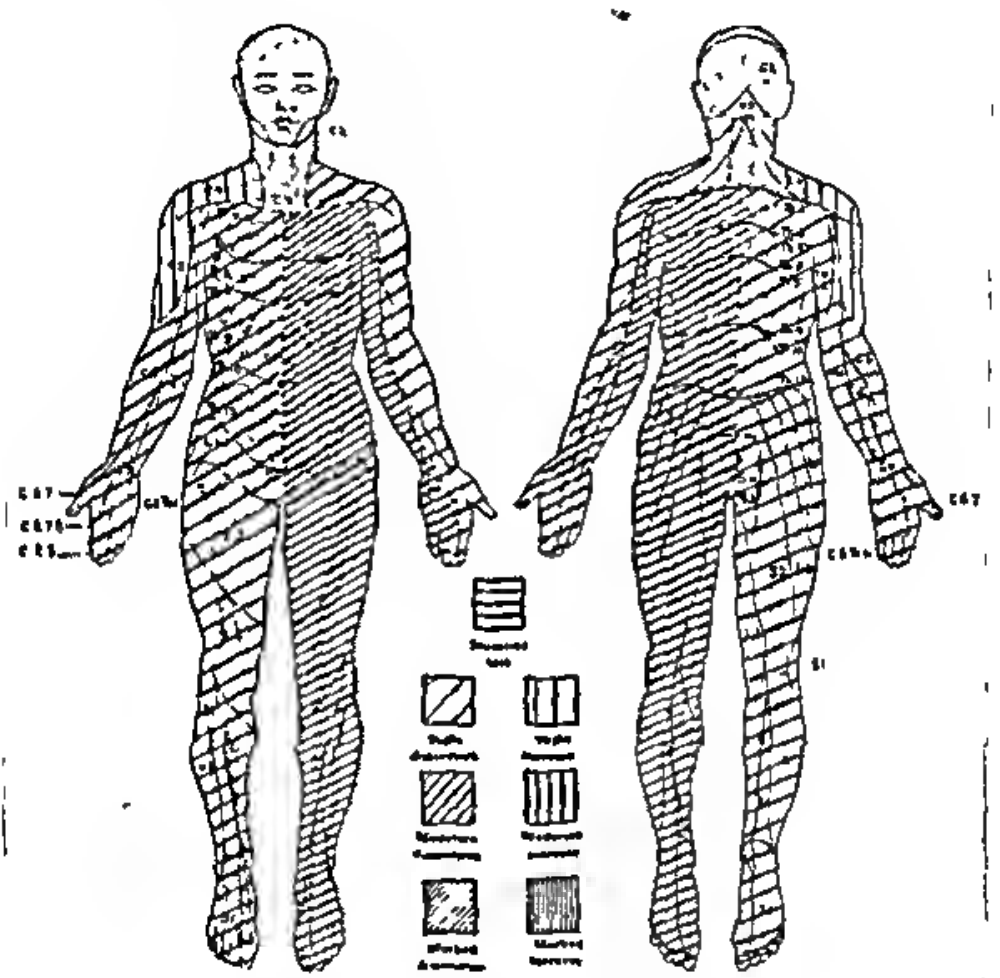

Fig 78

Sensation: Tactile sensibility is normal all over the body, the lightest touch with cotton being felt distinctly. There is a diminution in pain and temperature, sensibility over the entire body up to and including the shoulders, involving all sensory areas below that supplied by the third cervical segment of the spinal cord. The disturbance of sensation is more marked

on the left side of the trunk and in the left upper and lower extremities (see sensation chart Fig 78) Articular sensibility is normal all over the body but there is a slight diminution in vibratory sensibility over the right lower limb

Laboratory Examinations —The *x* ray examination of the cervical spine showed nothing abnormal The fluid obtained by lumbar puncture was clear, contained no cells and the Wassermann test was negative The manometric tests of the spinal fluid pressure showed no evidence of a spinal block, the fluid rose to a high level in the manometer tube when the patient blew her nose strained and when the jugular veins were compressed (Queckenstedt test)

Following the lumbar puncture there was a definite increase in all of the patient's symptoms

Diagnosis —Intradural spinal cord tumor compressing the spinal cord from the right and in front at the level of the fourth and fifth cervical segments This diagnosis is based upon the following facts

The symptoms began with root pain on the right side of the neck followed by an increasing weakness of the right upper and lower extremities, with exaggerated tendon reflexes on that side and with disturbances of pain and temperature sensibility most marked on the left side of the body up to and including the fourth cervical dermatome All these changes point to a compression of the spinal cord from the right side at the fourth cervical segment The fact that there is no disturbance in tactile sensibility is unusual, but in some high cervical cord tumors I have seen touch sensibility normal as in this patient

The reasons why I believe that the tumor lies more on the anterior surface of the cord are the following The absence of marked disturbances in the functions of the posterior white columns of the cord (which transmit articular and vibratory sensibility) and the presence of subjective sensations of burning on the left side of the body This contralateral burning is very characteristic of more ventrally placed tumors

Finally, a word regarding the results of lumbar puncture

and the manometric tests—in high cervical tumors the spinal fluid may be normal in all respects, as in this patient. Furthermore, the absence of a spinal block is not so rare in cord tumors, and one should never make the error of refusing to operate for suspected cord tumor only because there is no spinal block.

In spinal cord tumors that are adherent to the dura the symptoms and physical signs are frequently exaggerated after the removal of fluid by lumbar puncture. Such a change was observed in this patient, and it is probable, therefore, that the tumor is an extramedullary one which is attached to the dura.

The history and course of the disease and the results of the examination are so typical of a cord tumor that no other diagnosis can be made, and operative interference is clearly indicated.

Operation.—A typical laminectomy was then performed, the arches of the second, third, and fourth cervical vertebræ being removed. The patient had a short "bull" neck, so that the laminectomy was more than usually difficult. An incision was made over the spines of the second to fourth cervical vertebræ, the muscles separated from the bone on each side and held aside by an automatic retractor. The spines of the vertebræ were then removed at their bases with a large rongeur forceps, and the laminæ removed with smaller angular rongeurs.

When the dura was exposed it pulsated normally. Incision of the dura exposed the spinal cord, which did not appear abnormal in size, color, or position. The vessels on the posterior surface of the cord were not enlarged (Fig. 79, A). The arachnoid sac was then incised, and a probe passed upward and downward on the posterior aspect of the cord without meeting any obstruction. When a slip of the dentate ligament was divided and the attempt made to pass a probe upward in front of the cord on the right side, an obstruction was met with.

The cord was then carefully pulled to the left by traction on the dentate ligament and division of one posterior nerve root, and a tumor about $1\frac{1}{2} \times 1$ cm. in size, adherent to the dura, was exposed (Fig. 79, B). The tumor was of firm consistency and contained some cartilaginous material where it was adherent to the dura. After considerable manipulation the growth was

freed from its adhesions and removed. The dura was then closed by a running suture of fine silk, the muscles and fascia sewn together with catgut, and the skin with fine silk. A large protective dressing was applied.

Comment.—From the surgical standpoint the removal of tumors is generally no more difficult or dangerous in the cervical region of the spinal cord than at any other level.

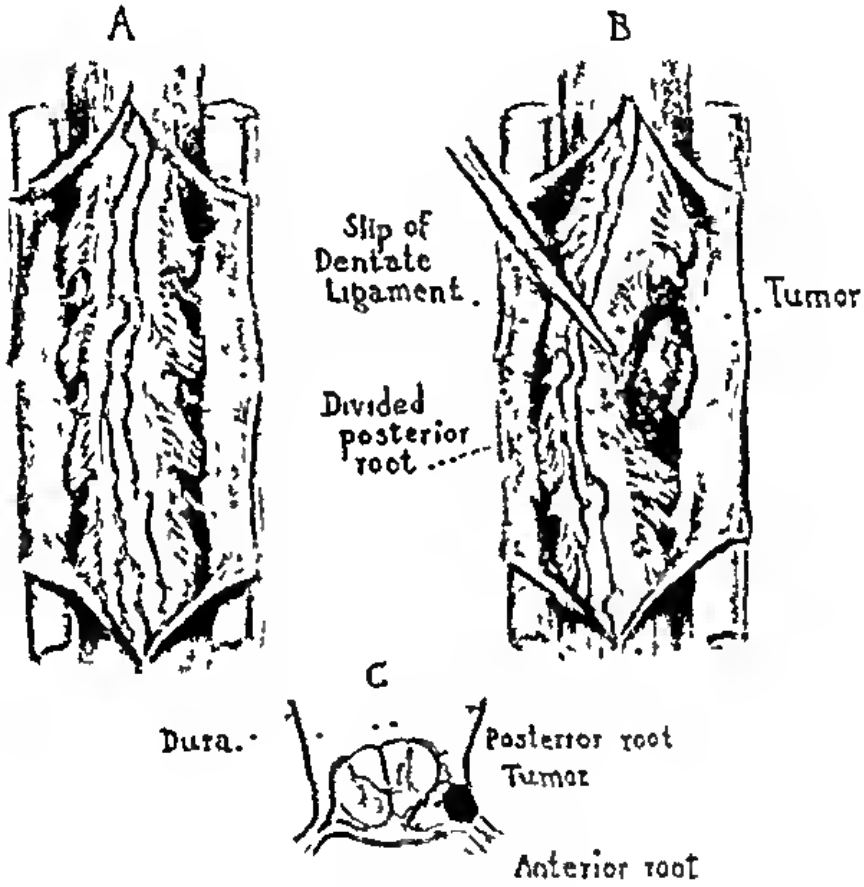

Fig 79.

In a patient with a short stout neck, as in this case, a good exposure of the field of operation is more difficult, as the arches of the vertebræ lie deeply underneath a large mass of muscles. In such a case, therefore, the position of the patient for the operation is of importance, and the head must be well flexed on the head-rest as if for a suboccipital craniotomy. For the adequate exposure of the deep parts of the wound an automatic retractor with long blades is essential.

For the removal of tumors from the ventrolateral or ventral surfaces of the spinal cord the cord has to be rotated and pulled toward the other side in order to expose the growth, and this manipulation must he carefully done, so that no trauma is inflicted upon the cord. The hest procedure is to grasp a slip of the dentate ligament with mosquito forceps, to divide its attachment to the dura, and to gently rotate and draw the cord toward the opposite side hy this traction If the exposure of the tumor is insufficient, more space can he obtained hy division of one posterior spinal root, as was done in this instance.

In the removal of the tumor the surgeon should always work in an outward direction, so that the manipulation of the cord is reduced to a minimum. It is a good viewpoint to consider that every time the cord is touched with an instrument or with the fingers harm is done to it.

Finally, a tumor that is found in front of the cord should never he grasped with a forceps and pulled out, no matter how loosely it is attached. Such a procedure would he certain to unduly traumatize a spinal cord which has already been injured by the pressure of the new growths. In my clinic we have operated upon a not inconsiderahle number of patients with tumor in front of the cord, and the results have been very satisfactory When the principles of technic above outlined have heen adhered to the return of cord function was as rapid and complete as in tumors on the posterior surface of the cord.[1]

[1] The patient recovered very satisfactorily from the operation, and left the hospital on November 15, 1924, twenty-five days after the surgical interference She has improved steadily since the operation

NEW YORK POST-GRADUATE HOSPITAL

Clinic of Dr. John J. Moorhead

TRAUMATIC SURGERY

This afternoon we have a series of cases which I think will interest you. Unfortunately we have not been able to get as many traumatic cases as we would like, but you understand how hard it is to do that to order.

Case I. Fracture of the Elbow.—The first case is a six-year-old child who three months ago sustained a supracondylar fracture of the humerus resulting in a flexion disability and a certain amount of bony ankylosis. The extension lacks 15 degrees Pronation and supination are excellent, flexion is to 90 degrees. There is a very decided bony spur which you can almost see. It is a typical deformation following epiphyseal separation and supracondylar fracture.

Fractures about the elbow-joint I divide into two general classes, and some of you will remember the two types that I use for my own purposes. Type I embraces those cases in which the fragments are displaced by their own diameter. These we call the displaced, the separated, or the overlapping type. Type II embraces those cases in which the fragments are not displaced by their own diameter, and these we know as the non-separated, the non-overlapping fractures The treatment of the Type II group is to let them alone if the general alignment of the limb is good. In Type I we first reduce, and then splint. In a general way the object is to convert Type I, the overlapping, into Type II, the non-overlapping. Either type may be simple or compound, and this typing applies to fractures in any location. It makes no difference what kind of a fracture we have. If it is a Type I, the essential thing is to reduce it, and to reduce

it at once. Another point is that a fracture is nothing but a wound of bone and a splint nothing but an external suture. When we put on a splint it is necessary, first of all, that it be safe, and, second, simple. A molded plaster-of-Paris splint is an excellent type of splint.

The earlier the reduction, the better for the patient and the better for you If we try to reduce a fracture after twenty-four hours without anesthesia we are very likely to get into difficulties, and, as a matter of fact, we should use an anesthetic in practically every case. Gas is the safest, ether by tbe drop method next, and ethyl chlorid by tbe drop method third. Cbloroform is extremely dangerous in any form of traumatic surgery

You will note that I have made a posterior incision and tbat I am finding tbe ulnar nerve. I have kept the elbow very sharply flexed, and what I am trying to do is to cut the capsule in such a way that I can promote flexion I do not wish to go into the anterior portion of tbe joint if I can get along without doing so, and I think I can My attitude is that tbe general angle of this limb is very good, and except for the limitation of flexion it is not a bad arm at all. I shall use a special periosteal elevator here, and you will remember that this particular instrument was devised by Ollier for working about the elbow-joint in doing that type of resection so much advocated by the French school, but which we as Americans decry.

For ankylosis of a joint I much prefer an arthrolysis to a resection You will see that I am keeping close to the bone, lifting all the soft parts thereform and in that way avoiding damage to the vessel You will now see that I have gained at least 15 degrees in flexion and that extension is practically perfect. You will note that here and there I have made a transverse cut in the capsule, performing a so-called capsulotomy. The late John B Murphy called particular attention to the advantage of this in elbow-joint cases

Bear in mind that in the elbow-joint there are two layers to the capsule. The inner layer contains embryonal bone cells, and when this is torn, as in a fracture or a dislocation, these

cells proliferate and give us that pseudobony enlargement which we find so often in this joint and which simulates a myositis ossificans One of the worst things to do in myositis ossificans of the elbow or elsewhere is to operate upon it early, because it acts practically like a keloid and will only recur if interfered with These bony swellings associated with injury around the elbow-joint should not be excised in the early stages The diagnosis in this case is fracture of the elbow The operation is capsulotomy and manipulation, with ether lavage of the joint and closure in layers I use ether in these bone and joint cases because it dissolves blood clots and fat and washes away without leaving a residue I use it also in cases of beginning suppuration of the knee joint or of the chest cavity It is very painful and produces the same kind of reaction as carbolic acid or iodin when injected into a hydrocele sac

The after care in this case will be motion of the joint every two hours through two round trips of motion because during the first forty eight hours postoperative reaction will be greatest, and unless we keep this surgical pot stirred up we will get a postoperative ankylosis quite as bad as that with which we started

I now squeeze out all the fluid and put on a wet dressing of gauze soaked in iodin solution, which is a favorite of ours, and which is made by adding 1 dram of tincture of iodin to 1 pint of saline solution

Case II Fracture of Humerus, Fracture of Ribs, and Lacerated Thigh and Scalp —The patient coming in now is a motorcycle policeman forty four years of age Fourteen days ago while on his motorcycle and traveling at about thirty-five miles an hour he ran into an automobile He was brought to us on the evening of the day of his accident, in the interval a temporary dressing had been put on his arm, and, unfortunately, his scalp and thigh had been sewed up tight The wound of the thigh was long, contused, and quite deep As might have been expected, it promptly broke down so that an area was left about twice the size of your fist

We treated his arm by putting it up in traction and suspension for about six days until we overcame the bony deformity, and then we applied a two-piece molded plaster-of-Paris splint which you now see. We bring him in today to do a secondary closure of his thigh wound under local anesthesia, and we are able to do this because clinically his wound is relatively clean and does not contain any streptococci, as proved by our laboratory tests.

This question of automobile accidents is a very important one for the profession because in every city automobile accidents are almost epidemic. I read recently some government statistics which show that 83 per cent. of the road fatalities are due to automobiles Of course, at one time a doctor did not have to take an accident case It meant too much attention and too little pay and he was apt to be sued for malpractice. That is all changed now because every doctor, whatever his specialty, is brought into contact with this accident problem, so that in a very practical way traumatic surgery has been changed by the wide-spread use of the automobile

In the second edition of my book[1] I wrote that I had never seen or heard of a proved dislocation of the hip in a person of fifty or over without a fracture in association. Last year I had an automobile accident case in a man of eighty-two who had a dislocation of the hip without any fracture, so never again shall I write that any given injury is impossible now that the automobile has changed so many of our preconceived ideas. Five or ten years from now we shall again revise our opinion when aeroplanes are more commonly used

In regard to lacerations, as time goes on I find myself sewing up fewer and fewer of them, but instead clean them up, put in the stitches, but do not tie them until the third day. This is practically doing a primo-secondary closure such as we did in France. Experience teaches us that if we can go forty-eight or seventy-two hours without infection we are not likely to have severe infection, if any If we do sew up wounds we should use interrupted stitches and drain all of them. If there is

[1] Traumatic Surgery, published by W. B. Saunders Company.

any evidence of streptococcus infection we should not use any sutures at all, and if the wound has been sutured we should undo the sutures promptly.

You see this wound on the inner side of the thigh. We have brought it into its present healthy state by leaving it exposed to the open air and by giving it an electric-light bath for one-half hour every four hours. I dislike to put dressings on wounds. We use a cage of wire when possible. Remember what happens to laboratory animals when we try to keep dressings on them. Dressings in man or beast so often mean nothing more than pus poultices. In any of these wounds that happen close to street dirt or garden soil we should give tetanus antitoxin. If we give it very slowly and in divided doses we will not get anaphylaxis. If we fear a serum reaction, let us have at hand a solution of adrenalin 1 : 10,000, so that we can give it immediately. Tetanus antitoxin should be given, of course, in all gunshot or pistol wounds, and in compound fractures of the leg, thigh, and arm it is also indicated.

As to skin-grafting, we, of course, have the Thiersch method, which can be done under local anesthesia. Another method is the snip-graft which is particularly good for deep granulations. We choose for this an area on the outside of the thigh and anesthetize it with novocain. Then we take an ordinary sewing needle and pinch up a piece of the skin about the size of half a bean, and transfix this with the needle and cut off the transfixed bean of skin, leaving it speared on the needle, and going deep enough to reach the fascia. We take off a series of these bean-sized pieces and plant them in the granulating area. This is a whole graft, and it works very well. A third way of filling in a granulating defect is to do what we are now doing

First I sparingly shave the edges to get a healthy area, taking off about 1/16 inch all the way around. This is débridement, but it always should be done sparingly and should not be sacrificial. The second step is to undermine the cut edges. The third step is to stop the bleeding either by pressure or ligature, and the fourth step is to bring the edges together by interrupted stitches of silkworm-gut. The fifth step is to

drain by rubber tissue or rubber band, and the final step is to put on a wet dressing of iodin saline solution. I am not in favor of antiseptics, and do not believe that they have much merit, however strongly they may be advertised or however strong the propaganda for their use may be I do not even accept the chlorin combinations which have had such a vogue, and am firmly of the belief that the field of an antiseptic is directly proportionate to the care with which we do our preliminary cleansing of the wound. If our débridement is satisfactory, we leave no devitalized tissue to nurture the organism, and then it makes no difference what we use in the wound, healing will go on. The field of the antiseptic, in my opinion, is very largely mechanical, and the washing away has, of course, considerable value. If we do our dressings in an aseptic way we avoid all the dangers of secondary infection, and this is one of the great merits of the Carrel technic, whether it is used or not in connection with Dakin's solution. I still continue to use Dakin's solution in certain cases of osteomyelitis and in certain cases of empyema, hut do not employ it as a routine.

Question: How is ether used in the peritoneal cavity?

Answer. It is used in suppurative peritonitis by some surgeons who pour in a certain quantity just prior to closure and drainage. A very good friend of mine in Chicago is a partisan to this method, hut personally I have not used it.

Case III. Fracture of Femur (Bilateral).—This young woman about twenty-four years of age had a fracture of each femur four years ago, but she came to us two and a half months after her original injury. The left femur had been plated at another hospital and union was firm on that side when she came to us. On the opposite side union was only partially firm and there was overlapping of the fragments Both fractures were at about the middle of the shaft of the bone.

The question came up as to the actual amount of shortening because on the left side some bone had been removed prior to the plating. In taking measurements of the lower extremities our practice is to make a triangle on our history record and call

the apex of the triangle u, meaning umbilicus, and then take on each margin of the triangle three points marked on the right side a b and c, and on the left side a^1, b^1, and c^1 The a represents the anterior superior spine, the b, the internal condyle, and c, the internal malleolus Instead of writing down on the record anterior superior spine to internal condyle," or "umbilicus to internal malleolus" we put the whole thing down in a graphic manner thus (illustrating on black board)

$$\begin{aligned} u\,c &= & u^1c^1 &= \\ a\,c &= & a^1c^1 & \\ a\,b &= & a^1b^1 &= \end{aligned}$$

It is understood that the prime side is the left side of the patient always This algebraic formula saves a great deal of time and is much more effective than the use of words

This young lady has had a series of operations and I bring her in today to show the effect of a small operation which I had not hitherto done until I had performed it on her in January 1924 I may say that we took out the plate on the left side and that we have obtained union in good position on the right side The limbs are about the same in length She has better knee motion on the left than on the right side Now the operation to which I refer I called for want of a better name fasciotomy, and it is not unlike a similar operation which is done for Dupuytren's contracture of the palmar fascia only in this instance the contracture is of the fascia lata When I first operated on her I made a semicircular incision on the outside of the right thigh and you can see the scar of it This incision carried me down to the fascia lata and in the fascia lata I made a series of transverse incisions about 1 inch long about 2 inches apart and, much to my great gratification I was able to gain some 10 or 15 degrees in knee flexion I later tried the same operation for a stiff knee following a fracture of the femur in a policeman, and with the same gratifying result so that I believe this operation has a place in that class of cases in which physiotherapy no longer is of avail and in that class of cases in which there is no bony ankylosis

Today I shall make a series of vertical incisions along the outer side of the thigh, each about 1 inch or 1½ inches long, and through these I shall introduce a tenotomy knife and transversely cut the fascia (Fig 82). The hemorrhage, as you see, is rather lively, and as I cut you can see that the knee gives slightly and that the muscle beneath the fascia gapes (Fig. 85), but there will be no danger of muscle hernia. I am of the

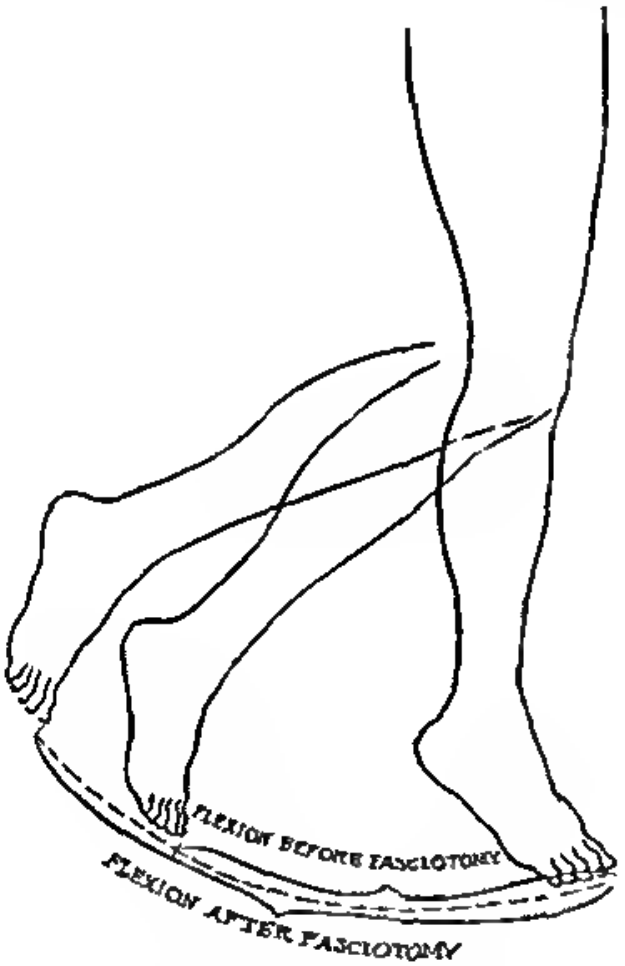

Fig 80

opinion that if I had done an operation of this sort a long time ago, before the contractures were so marked, she would have had even more knee-joint motion than she now enjoys (Fig 80) We must not forget that in every fracture of the femur, except of the neck of the femur, there is an associated synovitis, and that we may get an excellent result insofar as the fracture is concerned, but that our function will

be interfered with if we have joint adhesions or joint calculi as the result of the arthrosynovitis One of the essential things to do, therefore in the fracture of the shaft of the femur is to aspirate the synovitis withdrawing almost pure blood as is the case in practically any case of traumatic synovitis In passing let me say that our treatment of traumatic synovitis is immediate aspiration and immediate motion and we no longer immobilize these cases

The practice of breaking up under anesthesia adhesions in joints following injury is a very dangerous practice and I practically never do it We should put on an apparatus in these fracture cases that will permit us to mobilize the adjacent joints and at the same time let us visualize the injured part Hence beware of coffin splints which bury and often strangle the part, leading to death of tissue Our own practice is never to put on any circular plaster of Paris splint in recent injury except for fracture of the neck of the femur, and then only in selected cases

The question of some basis for estimating end result is important and we have had for a number of years a scheme for making the estimate in terms of figures based on three end result elements The first of these is "function," meaning by that the capacity to perform The second is "union" meaning thereby the state of repair, and the third is "contour,' meaning by that the external appearance Now the sum of these three elements equals the end result and we allot to each one of these elements a given percentage To function we give 60, union 20, contour, 20 When we come to rate a case, if the functional outcome is perfect we allot 60, if the union is perfect we allot 20, and if the contour is perfect we allot 20 Take this case for example She has not perfect function but it does not interfere much with her walking so that we will say that we have a 10 per cent loss of function, taking 6 off 60, we have 54 The union is solid and smooth and the callus is not irregular but we cannot give her 20 because it is not perfect So we shall make it 18 Then for the contour she has scars on the leg and a little curvature, so that we shall allow her about 15 on that Our end result, therefore, is 54 plus 18

plus 15 or a total of 87 per cent ; 87 from 100 per cent. leaves 13 per cent., so that our percentage disability is 13 per cent. Now, then, it seems to me that this is a better method than estimating in terms of words, and much better, for example, than using such terms as "good result," "fair result," "poor result."

QUESTION What is your opinion of plates in fractures?

DR. MOORHEAD: Personally I am very much against the introduction of any foreign body for any purpose, and I am of the opinion that we have no more right to use metal sutures in bone work today than we have a right to use them in operating on the soft parts or in doing a hernia. Ten years ago and more silver wire was used for suture material, and I believe we are passing through the same stage in bone-and-joint surgery that we passed through in soft-part surgery, and I think we are all putting our silver wire, screws, and plates lower and lower on the instrument shelves of our cabinets

QUESTION: What do you think of mercurochrome?

DR. MOORHEAD. I have not used it. I do not take much stock in antiseptics, and certainly cannot readily believe that any antiseptic delivered through the blood-stream is capable, overnight, of killing the suppurative organisms. If we changed our antiseptic every time we were asked to do so by some new literature or other propaganda on the subject we would be changing all the time. In my own practice I have been using iodin for a number of years and continue to use it, as it has rendered satisfactory service. As a matter of fact, in the treatment of wounds the original cleaning up, whether it is done by cutting away the bruised and destroyed parts (débridement) or by the use of soap and water and some antiseptic, these mechanical and chemical cleansing means, are the best germ killers. If the original treatment can be thoroughly given within a period of twelve hours after the receipt of the injury, the after-care becomes routine, and any antiseptic, or no antiseptic, will keep the wound clean if we prevent reinfection

Case IV. Fracture of Femur.—Man, twenty-seven years of age, struck by a taxicab October 1st He came to us about

five days after his injury wearing a Thomas splint which had been applied at another hospital There was an overlapping supracondyloid fracture with about 1½ inch overlap with the customary displacement namely the shaft riding in front and the condyles behind

We put him up in preliminary traction for a few days using adhesive straps and a weight of about 20 pounds doing this because there was a small wound on the anterior surface of the thigh so that technically he had a compound fracture Now in this class of compound fracture my own experience is that simple sterilization with iodin and the application of a sterile dressing suffices because punctured wounds of this sort are made from within and the chance of infection is much less than if the puncture was made from without as if from a bullet or other missile That, of course, is an essential difference between fractures in civil life and fractures in military life and because of these difficulties as to their conception they should not be handled alike

About four days after this patient entered the hospital we introduced skeletal traction in the form of a 5/16-inch nail passed through that portion of the lower end of his femur just above the condyle I may say that in every case of fracture of the femur except fracture of the neck my practice is to use skeletal traction practically always employing the nail in preference to the tongs because the latter have a tendency to slip

I have been unable by any means except skeletal traction to prevent deformity in a fracture of the femur when the following factors pertained

1 Fragments overlapped an inch or more
2 Case not seen within twenty four hours
3 Patient quite muscular
4 Supracondylar group

I am well aware that a number of reports have been made of the success of traction and suspension by the use of adhesive or glued straps applied to the skin of the patient and I have had a reasonable bit of experience myself with this method which is in reality only a modification of Buck's extension and an

overhead device which was used as long ago as our own Civil War. In my hands nothing but skeletal traction avails unless the fracture of the shaft of the femur is of what I call the Type II variety, namely, one in which the fragments are not separated, displaced,

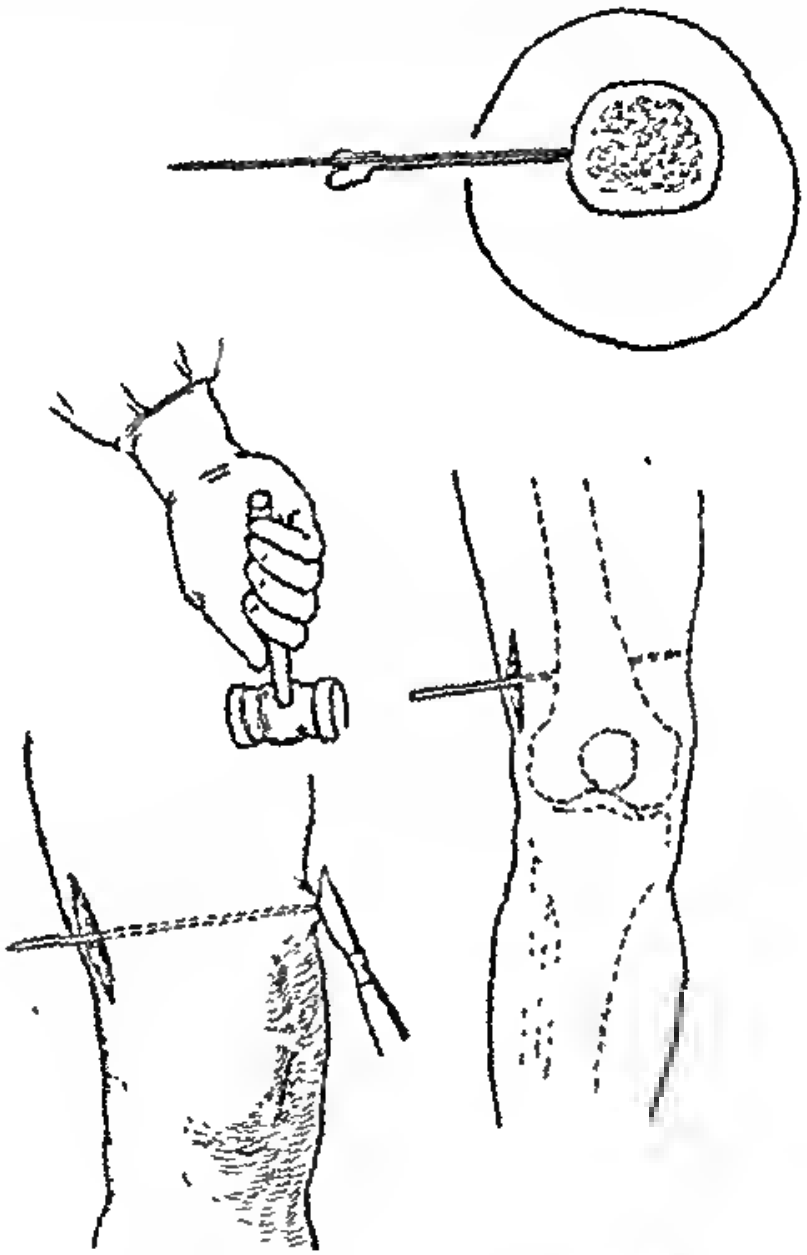

Fig. 81.—Steps in introducing the transfixion nail

or overlapped by their own diameter. In this class of case I believe that external traction is sufficiently efficacious, but in all others skeletal traction is my necessary choice

There are three forms of skeletal traction, one the nail,

two the tong, and three the stirrup, the last being limited to the introduction of a steel band over the curved surface on top of the os calcis. As to the method of introducing the nail, there are a few points which are of value. In the first place, the site of election is a point $2\frac{1}{2}$ inches above the external condyle

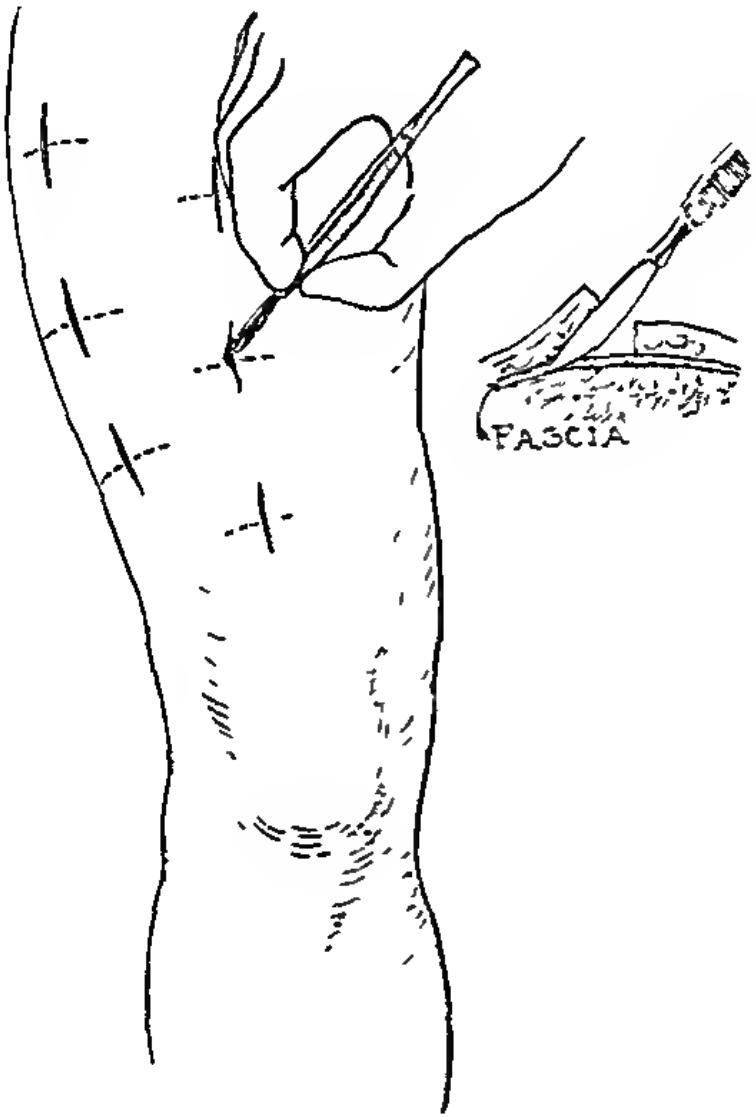

Fig. 82.—Incisions for fasciotomy.

on a vertical line between the condyle and the great trochanter. An incision 1 or 2 inches long is made down to the fascia lata at this point (Fig. 86, A, B). Through this the nail or a grooved director is thrust until the bone is touched. Then the point of the nail or the director is passed in front of and behind

overhead device which was used as long ago as our own Civil War. In my hands nothing but skeletal traction avails unless the fracture of the shaft of the femur is of what I call the Type II variety, namely, one in which the fragments are not separated, displaced,

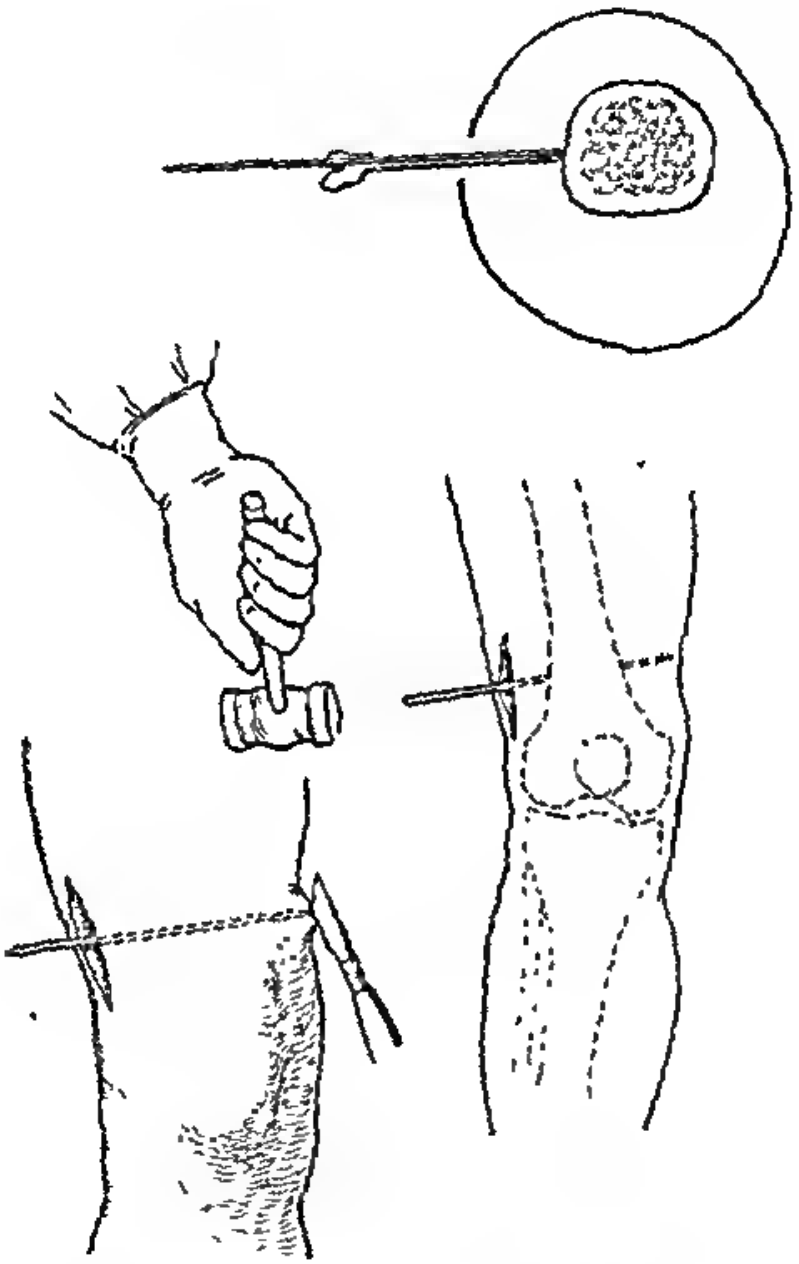

Fig. 81.—Steps in introducing the transfixion nail

or overlapped by their own diameter. In this class of case I believe that external traction is sufficiently efficacious, but in all others skeletal traction is my necessary choice

There are three forms of skeletal traction, one the nail,

dressing When the patient is sent to bed the knee is flexed about 15 degrees, the foot of the bed is elevated and in an

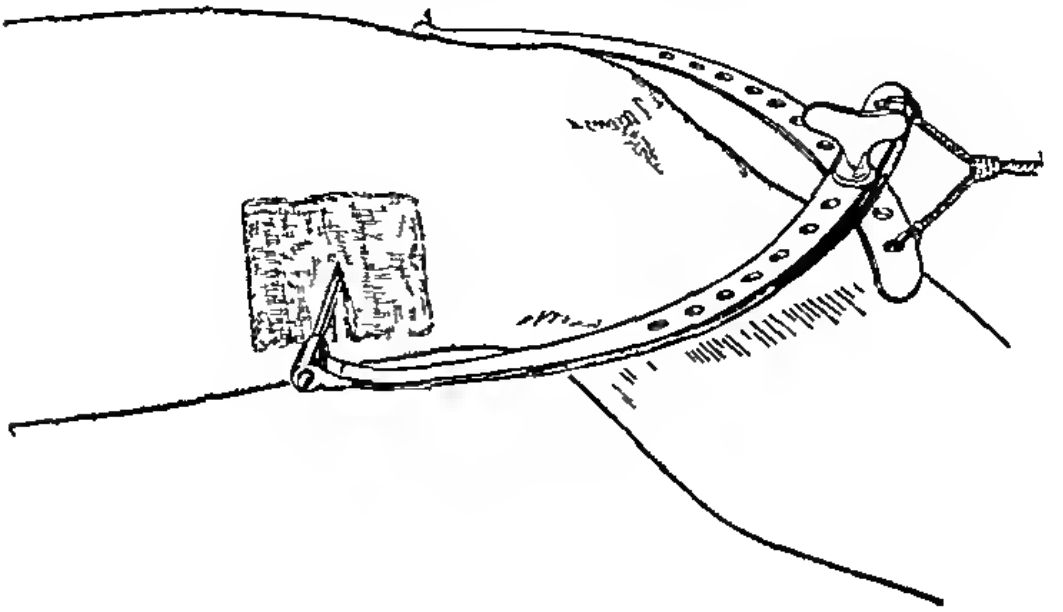

Fig 84 —Spreader and gauze covered nail

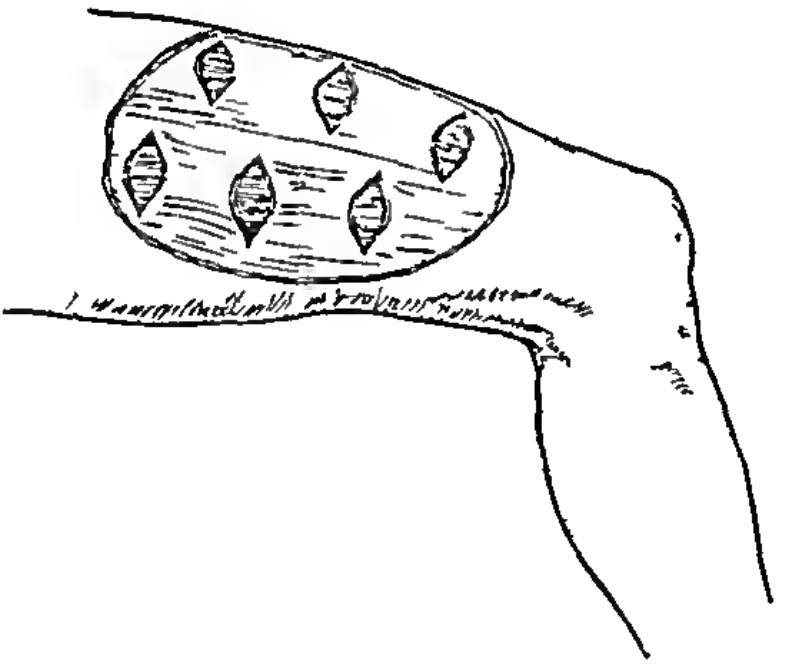

Fig 85 —Gaping in fascia following fasciotomy.

adult I immediately apply a weight of about 40 pounds Care is taken to see that the traction is always in the direction of the upper fragment because that is a basic rule for making

traction in any fracture. A bandage encircles the ankle, and to this a cord is fastened, passing to a pulley, and an overhead piece over the bed so that the patient by pulling on the cord keeps the knee-joint in motion (Fig. 87).

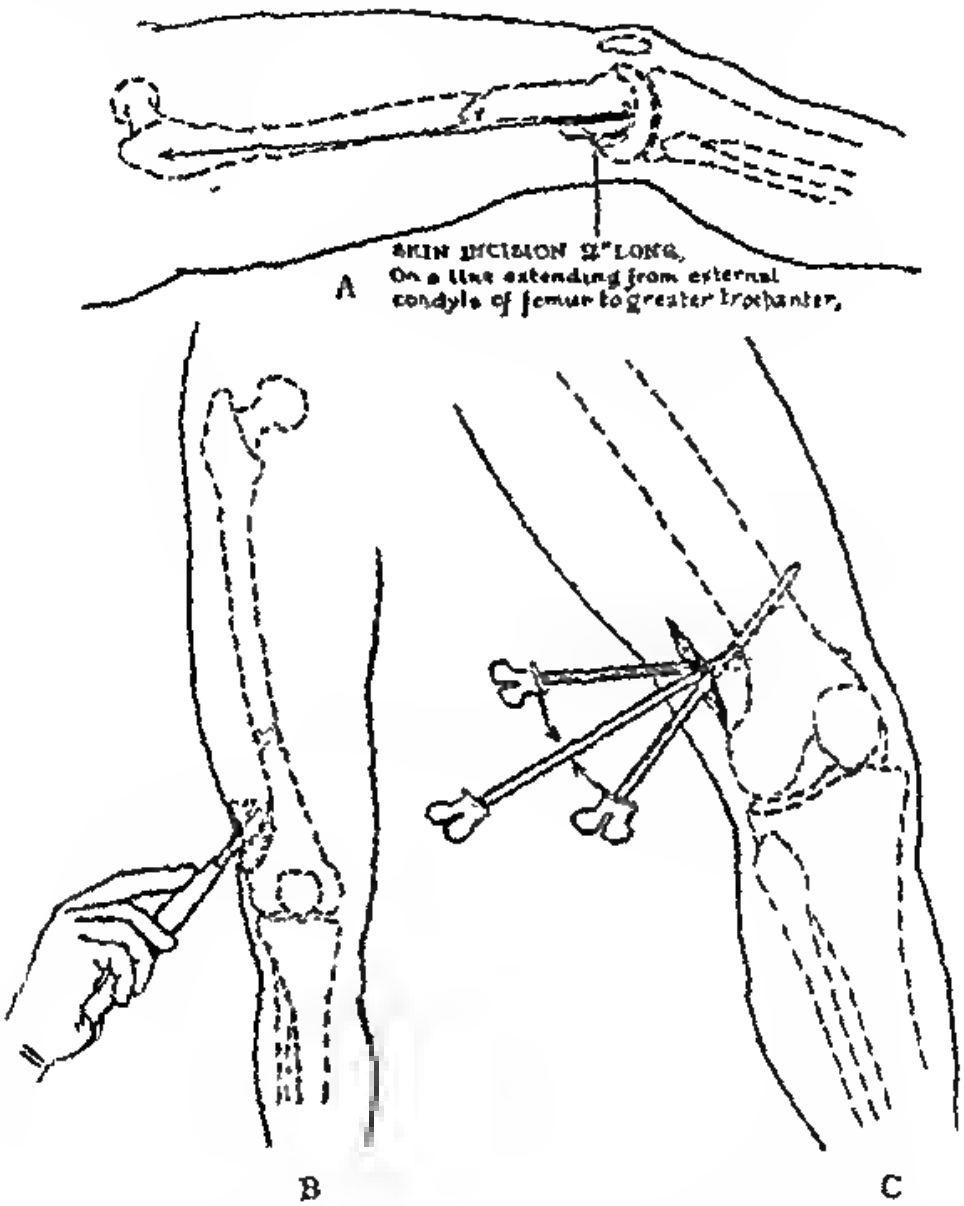

Fig. 86.—Line of incision (A and B), and grooved director seeking exact center of bone (C)

For the first five or six days the dressing around the nail is kept wet with iodin saline solution so that superficial infection will be limited, and since doing this there has been less tendency toward a purulent collection, such as might be expected when

any seton is used. Formerly I kept the nail in thirty or forty days, but now we try to remove it even as early as the ninth day, regarding it as a method of traction only, and when it has accomplished its purpose we substitute plaster of Paris, which remains on until union is solid, and then that is removed and walking callipers substituted.

In this man's case the nail has been in ten days, and we shall now remove it. You will notice that the spreader comes off readily enough. We have two methods of sterilizing the

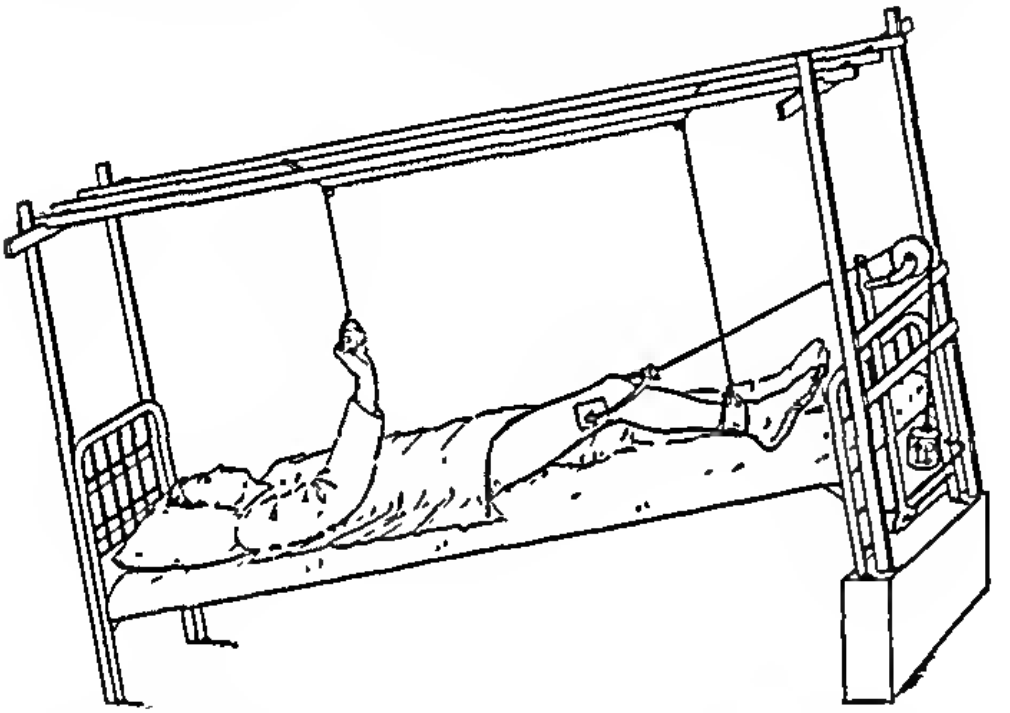

Fig. 87.—Showing complete apparatus and foot of bed elevated

nail before we remove it. One way is to sterilize one end by an alcohol flame, and the other is to sterilize it by the application of iodin. This latter we shall do in this case. Personally, I do not use the two-piece nail.

You will see that we take two pairs of artery clamps and fasten them on one end of the nail and then rotate the nail to loosen it from the soft part adhesions, and then by a rotation and a pull it comes out readily (Fig. 83). As you see, he is not under any form of anesthesia and has had very little pain.

In our department we have a method of keeping records of our *x*-ray films, and I published this method about ten months

ago. I am showing you some of the silhouettes of this case. To make these you need architect's tracing paper. This paper is placed over the film with a light shining through and a tracing made on the paper with a lead pencil Then the parts outside the bone are painted solid black with an ordinary brush, using a dull black, quick-drying paint. You see that the effect is just like a silhouette and that the outline is cast with great accuracy and may be seen from a distance, showing up extremely well when reproduced in a book or magazine

Every fracture, you will recall, goes through two stages on the road to union The first stage of union is what I call firm union, or "lead-pipe union," which means that the fracture line will bend The second stage is solid union, called by me "iron-pipe union" Wherever the fracture may be our practice is to remove a portion of our splint when the firm or lead-pipe stage of union is reached, and we remove the thigh splint when the solid or iron-pipe stage of union is reached. In all fractures of the lower extremity, except those of the fibula, we use walking callipers when union is solid, and in that way we get our patients up and about, obviating the crutch-wearing stage of convalescence.

This transfixion treatment looks as if it might be cruel, and, indeed, it is not unlike crucifixion, but, as a matter of fact, any method is not cruel which tends to pull malaligned bones into place, and our patients are surprisingly comfortable. I do not use ordinarily any Thomas splint or any form of apparatus to keep the limb in position because the traction of itself is all sufficient for that purpose. A pillow under the knee or one tilt up of a special bed provides the necessary angulation.

I have been using this transfixion method since 1912, and first began using it by employing an ordinary carpenter's bit introduced with a carpenter's brace, but, as already mentioned, I have now discarded all forms of transfixion apparatus except the simple nail which I show you

Case V. Laceration of Tendons of Thumb.—Patient aged twenty-nine, male, accident two days ago, due to a saw cut in a butcher shop

In respect to injuries of the hand my observation in this part of the country, at least, is that they are cared for very badly In cases of this sort it is very unwise to assume from even the most superficial surface wound that there has been no damage to the underlying tendons and we should make a test in every instance to determine accurately whether or not we have extensor or flexor power Assuming that we have evidence of a tendon injury, we should not assume that it may be taken care of within a few moments through the original wound, with perhaps a slight extension thereof On the contrary, wounds of the tendons of the hand often require a long time to make the surgical repair and most of them need a very extensive dissection For that reason alone we should not regard these injuries as trivial Nor should we delegate their care to inexperienced surgeons or house staff members There is no person within my hearing who would willingly submit the care of his injured or infected hand to a novice and yet I daresay that in no branch of traumatic surgery is more novice surgery done than in wounds or infections of the hands

This is a perfectly innocent looking wound and, as you see, it is on the dorsal surface As I spread it apart there is an obvious separation of the tendon which passes to the distal phalanx, but no involvement of the proximal tendon

The edges of this wound are quite ragged, so that I shall first smooth them by sparingly shaving the edges, thus performing debridement I call your attention to the evidences of suppuration now that the wound is widely exposed so that we must drain this wound and not suture it too tightly I now have the distal end of the tendon in view, but I cannot find the proximal end So I shall extend this wound in the intertendinous space I now find the proximal end and snip both ends of the tendon, coapting them with two sets of fine chromic catgut sutures the first passed as retention sutures and the last as direct coaptation sutures We will now close the wound with interrupted stitches of silkworm gut and put in a small rubber band for a drain It is now necessary to keep this in extension, and I do so by passing a needle and thread through

the finger-nail, bringing the end of the thread over the arching part of a wire splint shaped like a tennis racquet. Then we will cover the entire wound with an iodin saline dressing and take the drain out at the end of forty-eight hours

There is one type of infection of the hand that I think we should always remember, and that is the felon type, which is, strictly speaking, an osteomyelitis. The customary history of such a case is that the patient comes to us several days after a trivial or forgotten puncture, with the statement that the night before or for two nigbts it was impossible to sleep because of throbbing pain The attitude of the patient is quite characteristic, in that the involved finger is held high up in the air as if the patient came in with a flag of truce. Your examination discloses very little except a somewhat swollen and perhaps slightly reddened and somewhat glazed finger-tip, but it is very hot and quite tender. A diagnosis of felon can be made on the history of a forgotten or trivial puncture injury, the throbbing pain, the walking the floor, and tbe attitude of elevation of the digit. If seen early a unilateral incision through the finger pad is sufficient, but in most cases the finger pad should be split bilaterally so that the nail and the attached lateral portion of the pad form the posterior part of this flap, thus exposing the involved bone If incised early the shaft of the bone may be saved

We must also remember that in injuries of the hand there is a tendency toward pus collection in three main reservoirs, namely, the hypothenar, the midpalmar, and the thenar spaces. The best guides to the incisions to reach these are the normal palmar markings, having in mind always that at the deptb of the palm you may encounter the superficial or deeper arch. We must remember that in tenosynovitis of the finger it is bad surgery to make an incision along the palm, and equally bad surgery to cut through the palmar creases Hence our incisions should be made on the lateral portions It is a great help to have the patient soak the dressing, bandages included, in a hot solution before attempting to remove the dressing. It is also helpful to make the incisions liberally enough, so that

they will gape of themselves without requiring taxidermy to make them gape If gauze has to be used at all, it ought to be soaked in vaselin or oil, and by far the best drain is an ordinary stationer's rubber band because it is not hard enough to make pressure and will not have therefore, a tendency to erode blood vessels, as sometimes happens from rubber tubes As a matter of fact, all drainage should be removed very early, and by that I mean within three or four days

I like to have the patient soak the part in hot water two or three times a day, keeping the finger in motion while in the hot bath As soon as possible we take off all the dressings and begin exposing the part to the rays from an electric light bulb or, better yet, to the sunlight We should anticipate flexion deformity and guard against it by keeping the finger in extension, and this may be done by the method used in this case, by passing a needle and thread through the finger nail That, also, is a method we use in certain fractures of the fingers We have several of these cases in the service just now, and we should be very glad to have you see them together with the rest of our cases tomorrow morning at 11 o'clock

NEW YORK HOSPITAL

Clinic of Dr Charles L Gibson

The Harris Bands
Pneumococcus Peritonitis
Recurrent Ventral Hernia
Exophthalmic Goiter
Transfusion by Gravimetric Method

ASSOCIATES

Dr Arthur L Holland — Some Notes on Harris Bands
Dr Tracy Fisk — *Transfusion by Gravimetric Method*

THE HARRIS BANDS

Dr Gibson operated on a man with the following history Age fifty years Native of Italy Had patient under observation for two weeks in March, 1923 Complained of pain in right umbilical region for about fifteen years Pain has never radiated Has never had any jaundice No relation of pain to meals At that time fluoroscopic examination gave the impression that the fixity of the duodenal cap would indicate adhesions about the gall bladder The Lyons test would seem to indicate cholecystitis Patient refused operation at that time

At present the condition of the patient is not changed from last March except that the pains now appear to be more severe and radiate quite extensively Beginning in umbilical region, they radiate to both shoulders, and particularly to sacral and coccygeal regions Pain seems to radiate about equally to both sides of back

Physical examination was, to all practical purposes negative The picture seemed to fit pretty well one of the forms of Harris band that gives mild and indefinite manifestations of affections of the upper abdomen, and so an exploratory laparotomy was done under this tentative diagnosis No Harris band or other

abnormality of the upper abdomen found, but on prolonging the incision a very badly thickened, irregular appendix, bound down in the pelvis, was found and removed.

Remarking on the subject of the Harris band, Dr. Gibson said he was speaking as a convert to the possibility of its existence. He had seen a number of cases in previous years without attaching much importance to the presence of this band At first he thought that its importance lay in the possible distortion of the gall-bladder and cystic duct by the pull of the band, influenced by the filling and emptying of the gut. It is not until recent

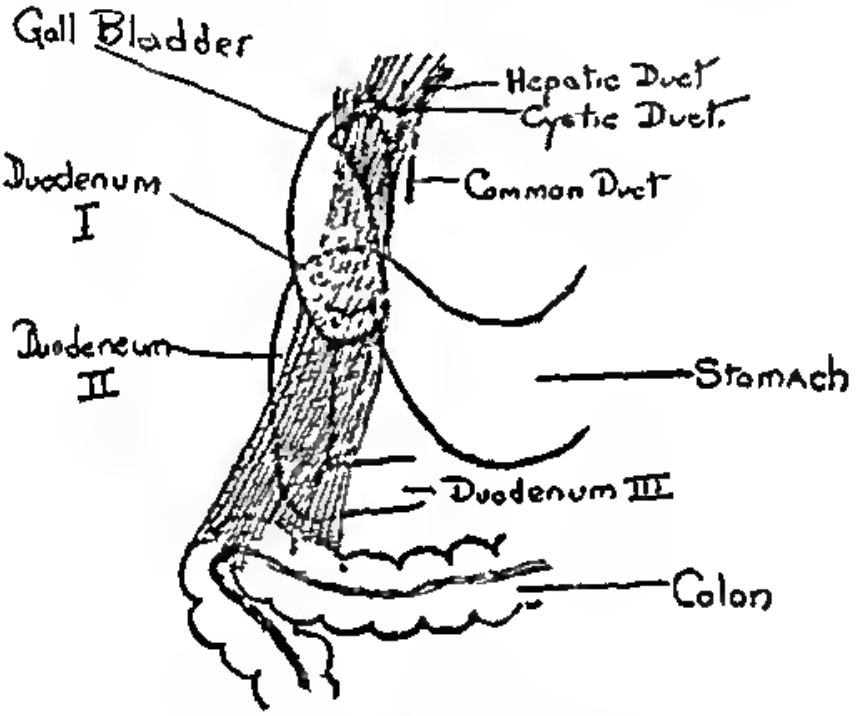

Fig 88.—Harris band (diagrammatic)

years that he has realized that its greatest importance lies in the compression of the duodenum, and it is noted in clear-cut cases that the duodenum is visibly released from [illegible] when the band is divided.

The band (Fig 88) is named following an [illegible] by Dr. M. L. Harris, of Chicago, published [illegible] the American Medical Association, April 1[illegible] consists of a peritoneal fold containing at times [illegible] of fat between the layers, and extends when [illegible] from the gall-bladder and cystic duct across to

colon or the transverse mesocolon as a distinct fold extending across the ventral surface of the duodenum at the hepatic flexure and becoming lost in the peritoneum over the pancreas or in the cephalic layer of the transverse mesocolon" It also has been described extensively by Alfred Taylor and W L Niles

On the whole little attention has been paid to the fact that it is an abnormal peritoneal membrane and not an adhesion, as it is quite commonly considered Most surgeons have quite ignored it, not even attempting to remove it, and have contented themselves with dealing with some organ such as the appendix, or, if they have divided it, have also done some other operation, and attributed the improvement to the other operation It is true that in the group of cases that I have analyzed the appendix has been taken out in the great majority of cases, or some other operation done Two cases, however, are very striking, in which the patients had severe symptoms, for which they underwent an appendectomy without relief, and later an operation for Harris band proved an unqualified success One of these patients was a chronic invalid for eight years, and six years ago an appendectomy was done without success Since her operation for Harris band a year and nine months ago she has been completely restored to health and enjoys life to its fullest extent

An analysis of the 31 cases shows 17 females 14 males The ages run from sixteen to sixty three, the greatest number occurring between the ages of thirty and forty

We note in the symptoms that the history of pain is a constant feature

	Cases
Pain in epigastrium	10
Pain in right lower quadrant	10
Pain in gall bladder region	2
Pain in left upper quadrant	3
Pain in abdomen	4
No pain	2

As the findings have sometimes been accidental all the cases have not been studied with the thoroughness that the con-

dition requires. We have, however, reports on 21 fluoroscopic examinations of the stomach and duodenum as follows:

Abstract of 21 Fluoroscopic Examinations:

	Cases
Postpyloric ulcer demonstrated	1
Antipyloric ulcer demonstrated	1
Ulcer suspected	1
Band	3
Extra gastric irritation	3
Adhesions	*1*
Negative	11

Summary of Gastric Analyses.—Of the 12 cases in which a gastric analysis was done only one showed hyperacidity; 5 showed no free HCl.

Summary of Operations:

	Cases
Division of band	6
Division of band and appendectomy	21
Division of band, appendectomy, and excision of cyst of right ovary	1
Division of band, appendectomy, and cholecystectomy	1
Division of band, appendectomy, and herniotomy	1
Division of band and cholecystectomy	1

(*Note* 2 of these cases had former appendectomies.)

End-results:

	Cases
Excellent	21
Good	5
Partial failure	2
Failure	1
Deaths (one of pulmonary embolism)	2

Some observers have felt that the *x*-ray plates and fluoroscopic examinations are of the highest importance in showing the high fixation of the first part of the duodenum (Fig. 89) The fact that most of these patients suffered from diminished rather than high acidity seems to be significant. The pain complained of is at times of very acute character. I remember seeing a patient in an attack, and he manifested all the agony of a patient with an extremely severe gall-bladder or kidney colic —agonized expression and bathed in cold sweat.

We have noted that the convalescence of many of these patients is unusually severe, and that oftentimes the early

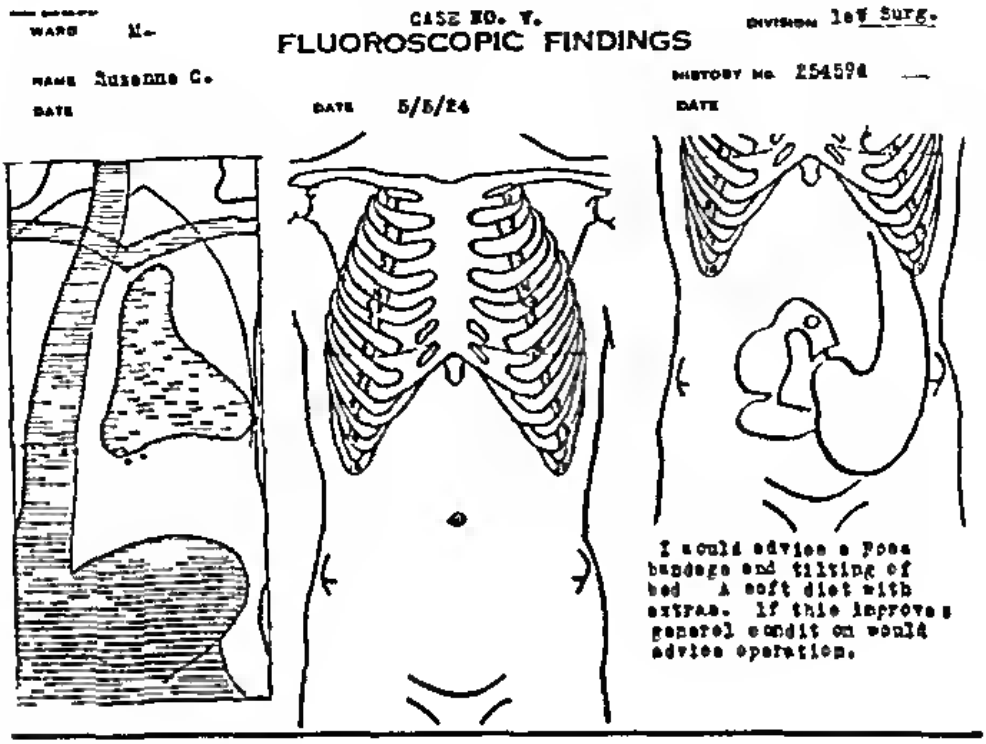

Fig 89

results have been disappointing; but these are happily replaced by extraordinarly good final results, of course, the ultimate criterion Only when we analyzed this series of cases did we

realize how good our results were. For this reason I think we must accept the Harris band as a real entity.

SOME NOTES ON HARRIS BANDS

DR ARTHUR L. HOLLAND

The duodenum is normally subject to considerable change in shape, tone, and position, depending on changes in shape, tone, and position of the stomach, as well as on the position that the transverse colon assumes under varying conditions The position of the duodenal bulb—the cap—is, however, relatively fixed Observed fluoroscopically it can by manipulation be pushed from side to side, elongated, and compressed, its outline in this manner somewhat altered, but a normal bulb will retain its conical if otherwise distorted shape throughout such manipulation.

The filling defects caused by an ulcer are easily seen and recognized [illegible] by the experienced fluoroscopist [illegible] The spastic incisuræ which often [illegible] are usually placed on the opposite wall to the lesion [illegible] incisura will usually be found to point to an irregularity opposite which is the actual ulcer defect—incisura and ulcer-filling defect being in the same zone

A defect which involves any part of the base of a bulb is almost certain to be caused by an ulcer The defects of ulcer cannot usually be obliterated by pressure. Defects in the bulb caused by pressure from without are also characteristic, particularly if the agent causing them is hard and unyielding—a gall-bladder, for instance, or a tumor mass By manipulation these irregularities in outline can be overcome, and the bulb so supported by pressure of the operator's hand that for that time at least the bulb can be made to appear normal in outline

This is also true of the defects caused by Harris bands or adhesions involving the bulb, but in these cases the defect is apt to be small and obviously not the result of a large tissue mass.

It is, therefore, comparatively easy to differentiate the

various defects to which the bulb may be subjected. Unfortunately for the fluoroscopist, Harris bands do not often involve the bulb in such manner that they cause defects here that can be seen. They may and do interfere with its mobility, but as adhesions also produce these results one can only rarely differentiate between them.

Dilatation of the bulb is nearly always caused by some impediment to its emptying. As ulcer is rarely placed far from the valve, one naturally thinks of adhesions when a bulb is seen to be symmetrically dilated, although a Harris band could just as well be responsible. If any part of the second portion of the duodenum does not participate in such a dilatation, it can be assumed that the stricture is at the apex of the bulb, and the usual cause is either adhesions or a band. It is here impossible to differentiate fluoroscopically; adhesions are the more common.

The second portion of the duodenum is relatively freely movable. Under manipulation it can be moved about to a considerable extent. Normally its caliber is fairly constant. Its peristaltic activity can be studied. Unless interfered with by some abnormality this is seen to progress regularly. The opaque meal spreads out thinly and evenly, giving to this part of the screen shadow a feathery or herring-bone pattern, quite different from the clear-cut black outline of the bulb shadow.

Ulcer is rare in this second portion, so that if dilatation is seen here, with obliteration of the herring-bone pattern and a dense, clear-cut outline takes its place, and if reverse peristalsis is observed proximal to such a shadow, kinking, adhesions, or a band may be the cause.

A kink can be reduced; the stasis caused by a band can also be relieved by pressure which alters the position or direction of this part of the tube; adhesions are apt to limit the mobility of this part, and, while in most cases the opaque material can be forced past the obstruction, the part of the tube that is thus compressed is seen to be more or less fixed.

The defect caused by a band involving this second portion is usually characteristic. In some cases one can almost visualize

the source, the course, and the attachment of a band by the defect shown in the shadow. These are easy cases to diagnose, but they are not too common.

It has already been pointed out that there is seldom any serious delay in gastric motility in these Harris band cases unless, as rarely happens, the hand compresses the tube severely, or, acting as a sling, strangulates the tube to an excessive degree It is therefore interesting to speculate on the causes back of the rather pronounced symptoms that are so often complained of in these cases.

The acid values of the gastric secretion are, as a rule, not markedly increased, probably because the gastric motility is not impaired Impeded motility causes increase in acid. The appetite, therefore, which depends so largely on gastric acidity, is rarely increased as it is in ulcer

McKenzie has taught us, and his observations have been amply confirmed, that the abdominal viscera are insensible to ordinary forms of irritation, such as cutting, pinching, or burning A hollow viscus, however, resents alterations in the intratubular tension which is normal to it, and in a roundabout way, through the sympathetics and surface or muscular reflexes, will register a protest, as *pain* when tension is increased beyond a certain limit.

In the interests of intestinal motility tension is maintained at the highest level in the duodenum. This diminishes gradually down to the terminal ileum The limits to expansion that a Harris band imposes on the duodenum which is so vitally concerned in maintaining a high tension could easily account for much of the distress

Nausea can occasionally be demonstrated to coincide with reverse peristalsis in the duodenum

The vomiting that so often is a feature in these cases is usually of a reflex character; it is rarely of the retention type. Bile in the vomitus can, of course, be explained by reverse peristalsis.

While the indigestion, which is peculiar to this condition, is usually chronic and extends over a number of years, there

appears a certain vague periodicy not as pronounced however as in ulcer The acute exacerobations are often coincident with overwork or fatigue They are worse when the patient is constipated Loss in weight would seem to precipitate attacks in some individuals These factors all probably operate by changing the tone or position of the structures that are in relation to the duodenum particularly the colon which sinking to a low plane because of deficient tone drags on the duodenum through the mesocolon With a band fixing the upper portions of the duodenum the syndrome that Dr Gibson speaks of is made possible

PNEUMOCOCCUS PERITONITIS

Dr Gibson showed the temperature chart and differential count of a series of pneumococcus peritonitis His earlier experience has been described in a paper on Pneumococcus Peritonitis written with Kenneth Johnson in the Surgical Clinics of North America April 1921

Since that time he has had 3 more cases making 9 in all 3 died

Our knowledge of the etiology of this condition has been definitely established by the work of McCartney and Fraser [1] These authors have cleared the situation by dividing the condition into primary and secondary the primary being limited to females more particularly very young girls the infection coming via the pelvic organs The second rare form which is sometimes seen in males always accompanies a frank established pneumonia

Pneumococcus peritonitis while uncommon is probably not so rare as it is thought to be A certain diagnosis must establish the presence of pneumococci from a culture of the peritoneal fluid For varying reasons in otherwise perfectly acceptable cases this valuable evidence has not been available The types vary and some may pass into a subacute or even chronic condition Some may be fulminating and the pa

[1] British Journal of Surgery vol ix No 36 April 1922 Journal of Pathology and Bacteriology 1923 vol 26 pp 507 517

tient die within forty-eight hours of the first manifestation from an overwhelming toxemia.

In a typical case the onset is acute, with vomiting, abdominal pain, for the most part in the lower abdomen, general malaise, and high fever. Constipation, as is common in most forms of peritonitis, is not the rule, and some complain of diarrhea. The patient, while acutely ill, is apt to be rather apathetic, sleeps a good deal of the time, and is roused with some difficulty, a feature different from the ordinary acute peritonitis.

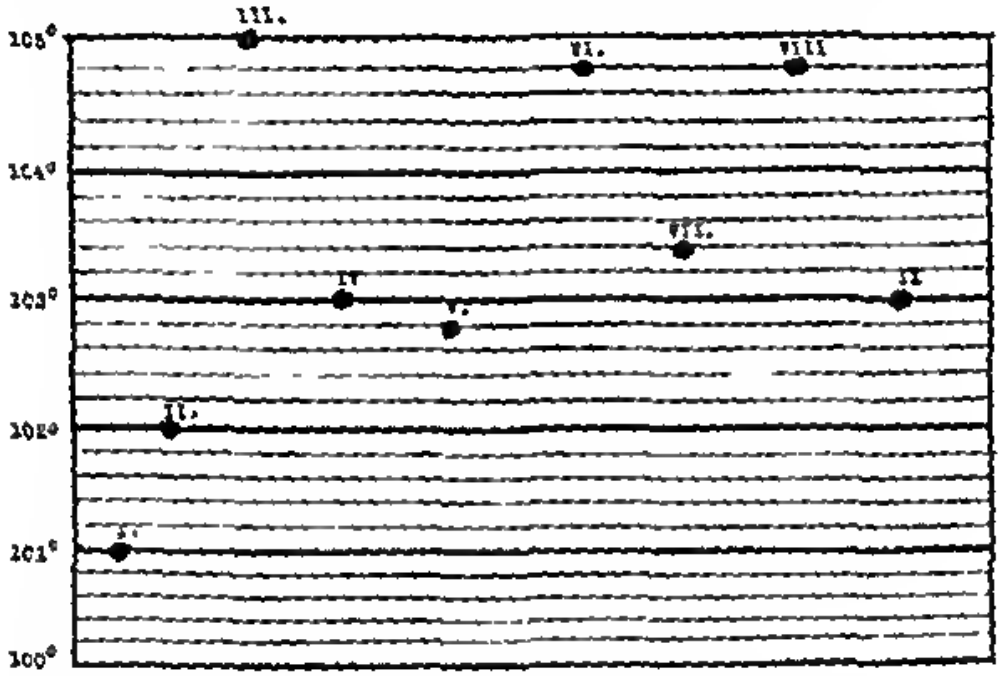

Fig 90.—Highest preoperative temperature

With the progress of the disease the abdomen becomes distended and tenderness increases; but it is noted that the tenderness is not so great as in other forms, and that with the progress of the disease the patient does not present the common extreme prostration

The initial temperatures vary; but are, for the most part, high and remain so (Fig 90).

Taken with the above manifestations the blood-findings are important, and often will give strong evidence of the nature of the disease The chart (Fig. 91) shows that in the majority of cases we have an unusually high total leukocytosis and per-

centage of polynuclears If their relation is plotted out on Gibson's Standard Chart a surprising and seeming anomaly takes place, for in the majority of cases there is a sharply falling line instead of a rising line, as we expect to get in the severest forms of appendical peritonitis This ratio, however, has been

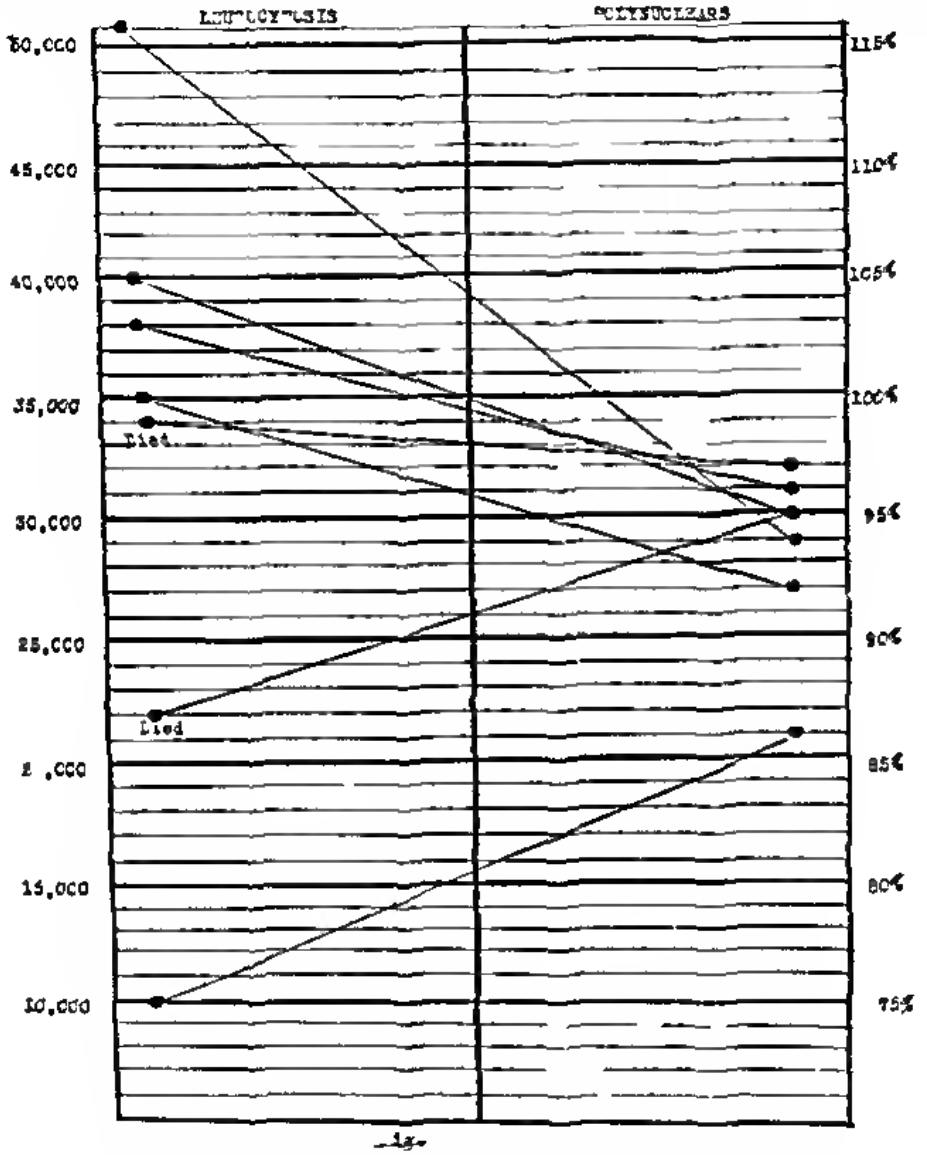

Fig 91 —Differential count in pneumococcus peritonitis

reversed in the fatal cases, where we have a line that either nearly balances horizontally or rises It is particularly these extraordinarily high total leukocytosis counts that should put us on our guard. A number of cases have presented also a herpes on the lips.

Pneumococcus peritonitis is a severe disease with a very high mortality. The early observers reported so high a mortality following operation as to recommend conservative measures, waiting for the process to become localized, and then opening circumscribed abscesses. We cannot subscribe to this view We think it is dangerous to recommend waiting in any case of peritonitis for fear we should make a mistake and let an appendical peritonitis go unoperated On the other hand, we are frankly puzzled about the problem of operative relief. Most of these cases will present at some time a positive blood-culture for the pneumococcus of the same type as found in the peritoneal fluid What we are doing at operation is to remove the fluid and institute drainage If the patient gets well it is hard to say whether it is because of our procedure or in spite of it

In theory it would seem wise to treat these patients by a specific treatment against the pneumococcus, or to add such treatment to our operative procedures The value of these specific treatments for pneumococcus infections is still sub-judice McCartney and Fraser have reported the reduction of their former high mortality down to 40 per cent, since they have treated their more serious cases with small repeated transfusions (20 c c) from the children's parents

Only 2 of our cases have received any form of specific treatment; 1 who died in less than twenty-four hours after operation received one dose of polyvalent serum, and the other received full doses early of the antibody, supplemented by a blood transfusion

RECURRENT VENTRAL HERNIA

Dr. Gibson presented a case of repair of large recurrent ventral hernia by his fascial flap operation, history as follows:

C. S. Female. Age sixty-two.

First operation· October 16, 1902 Repair of epigastric hernia

Second operation· August 15, 1912. Repair of incisional hernia.

Third operation September 8, 1913 Repair of ventral hernia with insertion of wire filigree

Fourth operation October 29, 1918 One year ago patient noticed bulging to left of old ventral hernia repair scar This has not increased in size Five or six weeks ago near right side of site, a wire broke out through skin Comes in complaining of pain in old scar and protrusion of abdominal wall

October 31, 1918 Under local anesthesia wire filigree is removed by Dr Gibson

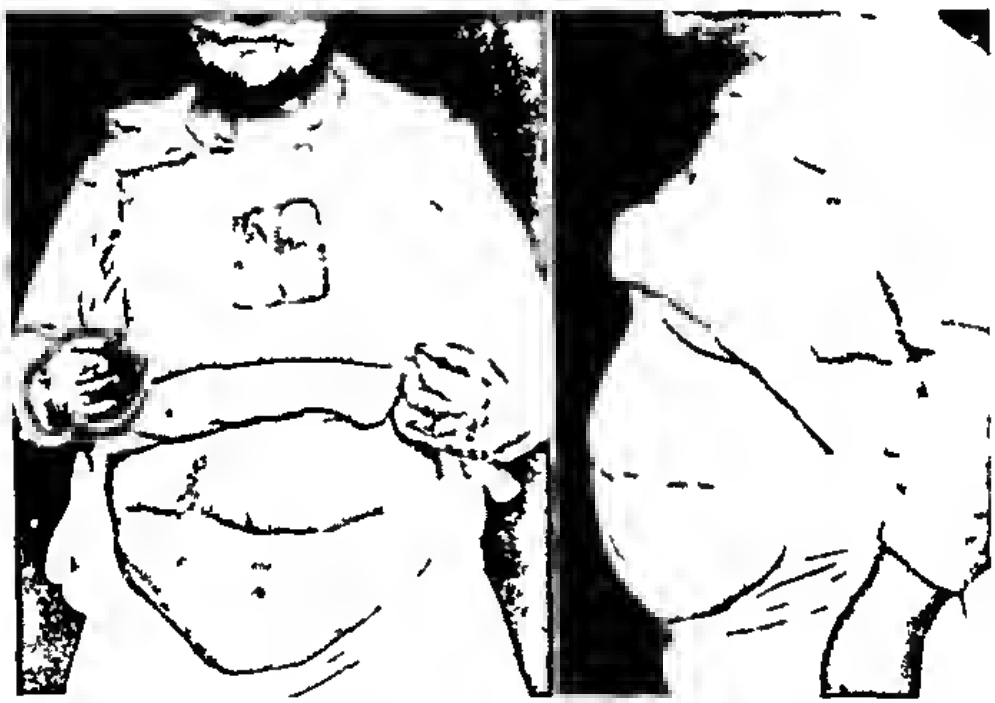

Fig 92 —Shows multiple scars of herniotomies and filigree removed at fifth operation

November 23, 1918 Fascial flap operation for ventral hernia is performed by Dr Gibson

Dr Gibson said the first operation of this character was done in 1914 Until recently the operation had been limited to the seemingly inoperable postoperative ventral hernia Of late he has applied it to the more difficult cases of radical cure of umbilical hernia as he has seen so many cases recur after the fascial overlapping operation, so called Mayo Blake, even when done by the best operators

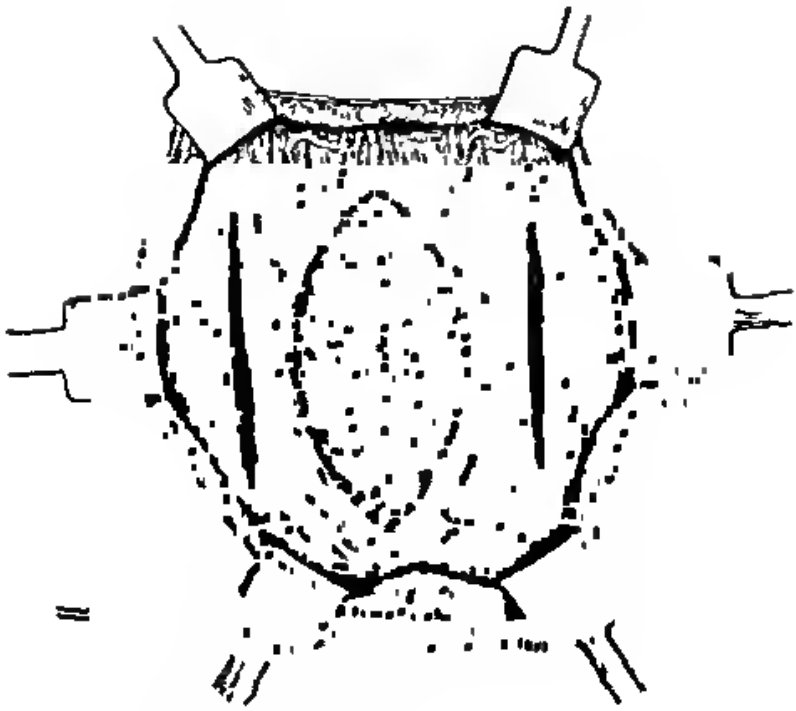

Fig 93 —Releasing incisions in fascia of the rectus muscle parallel to the line of suture.

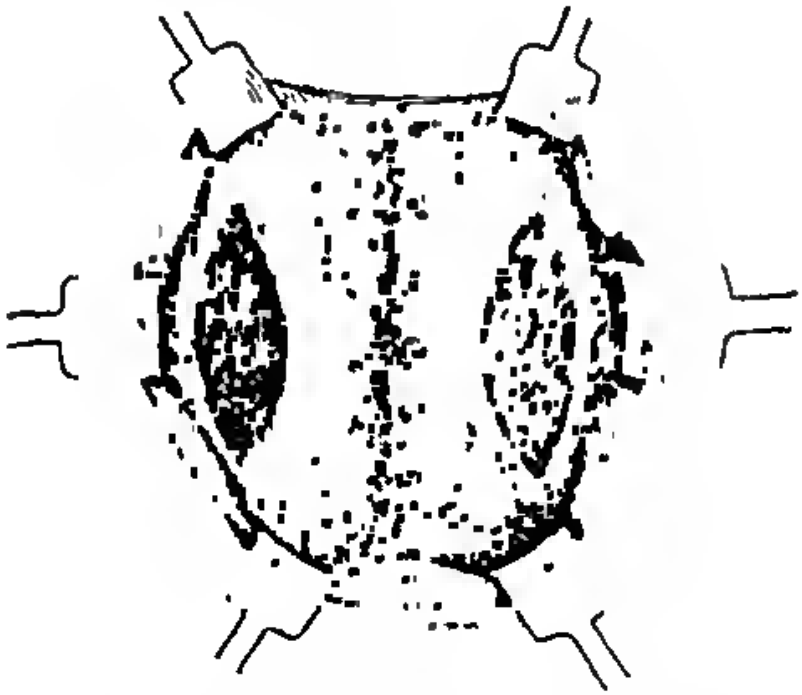

Fig 94 —Edges of fascia reunited in midline without tension

These operations are long and difficult, as the prolapsed omentum, etc , has to be dissected away, and so far as possible the various layers of the abdominal wall approximated In

many cases where there is loss of muscle and fascia from infection or loss of nerve supply little material can be obtained and much ingenuity has to be exercised to borrow tissue from whatever available source (Figs 93, 94)

All the operations have been successful save one In this extraordinarily difficult case, extending from the epigastrium to the pubis, with repeated unsuccessful operations, there is a small protrusion in the epigastric portion of the repair which gives the patient absolutely no trouble

A second case was presented by Dr Weeden to show that this type of operation cures large umbilical herniæ even under extremely unfavorable conditions

This patient was operated on by him in February, 1923 for the cure of a large umbilical hernia, size of head, with symptoms of strangulation for the past three days The following day the patient went into diabetic coma, which was successfully combated with insulin Developed a very severe bronchitis, with cough, which put great strain upon the abdominal walls Ten days after operation the entire wound broke open down to fascia, and there was massive sloughing of the subcutaneous tissue As her diabetes was brought under control the wound began to clean up, and by using Carrel Dakin dressing it was possible on the fifty first postoperative day to do a resection of the wound and a secondary suture Wound healed by primary union

She now returns with a firm abdominal wall and no signs of recurrence of her hernia

A number of surgeons present examined these patients and all reported the wall to be absolutely firm

EXOPHTHALMIC GOITER

Dr Gibson presented a case of exophthalmic goiter, history as follows

Patient Lillian F Age twenty five Married, 3 children

Chief Complaint—Very severe and acute exophthalmic goiter Under treatment in Medical Wards of New York Hospital twenty five days

First Operation—May 16, 1923. Resection of right upper pole of thyroid under local anesthesia (Fig. 95) Discharged May 30, 1923. Some improvement.

Second Operation—June 23, 1923. Resection of upper third of left lobe under local anesthesia (Fig. 95). Discharged July 4, 1923 Considerable improvement.

Interval Note—During this second operation under local anesthesia and for some time after—exact period not known—voice was normal Then became husky. When she returned in the fall there was only a whisper.

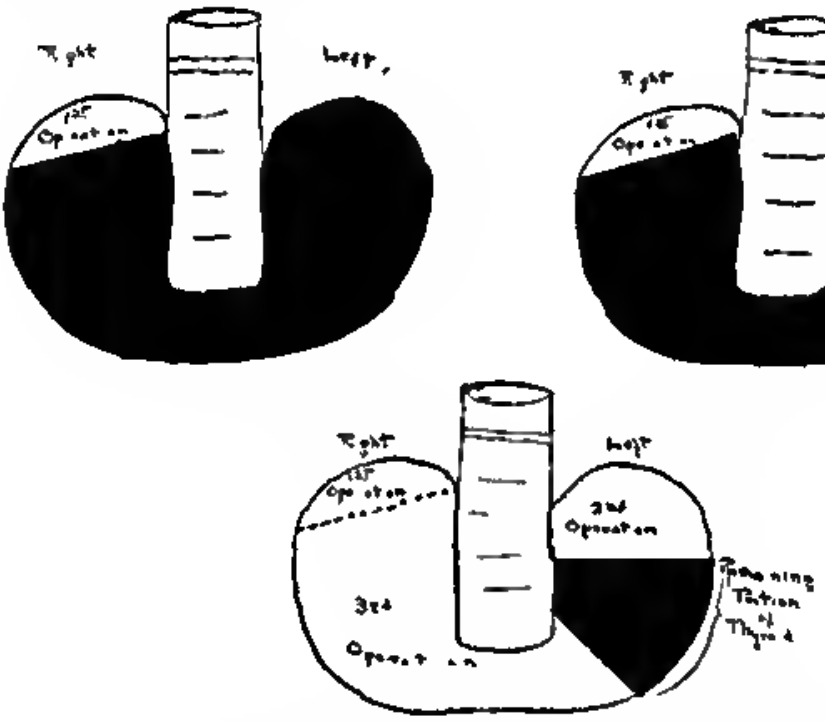

Fig 95—Patient, Lillian F Three operations for exophthalmic goiter

Readmitted October 29, 1923. Laryngoscopic examination by Dr. Erskine October 31, 1923: "Left vocal cord does not move. There is adductor paralysis, probably due to injury of left recurrent nerve"

Third Operation—November 24, 1923. Gas oxygen anesthesia Removal of remaining right lobe, isthmus, and lower quarter of adjoining left lower lobe (Fig. 95).

Immediately after operation patient's voice began to clear and steadily improved, so that on discharge, December 10, 1923, it was practically normal.

Examination of larynx ten days after operation by Dr Erskine "It was noted before operation that left vocal cord did not move perfectly toward the median line At present the left vocal cord moves toward the median line and the cords approximate, but there seems to be still a slight weakness of the left cord"

Metabolism —Prior to first operation April, 1923—145
Prior to second operation June, 1923—160
Prior to third operation October, 1923—171

After last operation
November 15 1923—110
November 21 1923—111
December 8 1923—116

At the end of the presentation of the patient she was requested to speak for the benefit of the surgeons present, which she did in an absolutely unimpeachable loud and distinct voice

This case was presented on account of the possible important medicolegal question raised Following the disturbance of the voice after the second operation and in conjunction with the laryngoscopic report had the patient brought suit for injury to the nerve it is quite possible that experts could be found to swear that the patient's contention was correct Just why evidences of interference and pressure developed some time after the second operation and disappeared suddenly after the removal of a portion of the thyroid overlying the recurrent laryngeal nerve it is a little hard to say, but it should be remembered that such disturbance can occur without any direct operative interference with the nerve as in the second operation the portion of the thyroid removed was well away from the site of injury to the nerve

TRANSFUSION BY GRAVIMETRIC METHOD

DR TRACY FISK

Recipient Helen M fifteen years run over by bus on October 3 1924

Method.—The gravimetric method described in New York Medical Journal, July 18, 1923: Coupling of vein of donor with vein of recipient by a 7-inch rubber tube with Fordyce needle at each end, quantity of blood transfused being measured by having donor's or recipient's table on a scale. No pump is used, the propulsive force being the high pressure caused by a tourniquet on donor's arm. Gravity aids the flow, as the donor's table is the higher.

Donor and recipient were placed on their respective tables, and to the arm of each was applied a snug tourniquet. When the donor was balanced on the scale Dr. Fisk inserted a No. 14 needle in cephalic vein of recipient, pointing centrally, and instantly the recipient's tourniquet was removed and with gloved finger any waste blood was stopped Dr Fisk then inserted a No 13 needle in vein of donor, pointing peripherally. To this needle was already attached a 7-inch rubber tube, vaselin coated, with a Fordyce adapter at each end. While the blood was pouring in good volume from this tube it was quickly attached to the recipient's needle. The transfusion then proceeded automatically until the desired amount (400 G) bad gone over Then the tube was closed by compression, the recipient's needle was removed from the vein, the donor's tourniquet taken off, and the donor's needle removed. The arms of both patients were elevated, and small bandages were applied to the tiny needle wounds

No febrile reaction and hemoglobinuria developed

NEW YORK HOSPITAL

Clinic of Dr. Frederic W. Bancroft

ASSOCIATE
Dr. Alice R. Bernheim: **The Icterus Index**
Liver Function Test

Third-stage Skin Plastic for Chronic Hematogenous Osteomyelitis.

Cholecystectomy for Chronic Cholecystitis.

THIRD-STAGE SKIN PLASTIC FOR CHRONIC HEMATOGENOUS OSTEOMYELITIS

This case is presented to you because I believe that this boy presents many of the complications that occur in acute osteomyelitis in children, many of the mistakes that may arise in the treatment, but, notwithstanding, I believe his end-result will be satisfactory.

This boy was admitted to the hospital fifteen months ago, having been ill for a week with pain and tenderness over the right leg, and complained mostly of pain in the region of the ankle-joint. His temperature on admission was 104° F. His history is as follows:

The patient is a boy, sixteen years old, who comes to the hospital complaining of an unhealed wound in right leg. The patient had always heen quite well, without any previous serious illness. He was first admitted to this hospital fifteen months ago complaining of swelling and pain in rigbt lower leg, and stated that it had hegun seven days before admission. Except for this his history was essentially negative

Physical examination was negative except for right lower leg and foot, which was diffusely swollen and red from the knee down. It was red and hot, and there was pitting edema and brawny induration. There was marked tenderness over the

shaft of the tibia, which was increased over the lower half. There was tenderness on bone percussion The motion at the knee-joint was fairly free, motion at the ankle-joint was limited and painful There was no mass in the popliteal space, nor was there any phlebitis, inguinal adenitis, or femoral lymphangitis The temperature on admission was 104° F White blood-count was 23,600, 86 per cent polymorphs. Urine negative Blood-culture showed Staphylococcus aureus in twenty-four hours The diagnosis was acute osteomyelitis of the shaft of the tibia

He was operated upon immediately after admission An incision and drainage of a subperiosteal abscess of the right tibia was done The periosteum was found stripped from the bone, and as the periosteal elevator was passed upward a large quantity of thick, odorless pus was evacuated at the junction of the middle and lower thirds of the tibia The patient ran a stormy postoperative course, temperature ranged from 100° to 105° F He remained in the hospital for seventy-five days During that time a second and third osteotomy of the tibia were done He also had an incision and irrigation of the knee-joint, an incision and drainage of an abscess beneath Achilles' tendon, and an exploration of the popliteal space. His blood-cultures were sterile following first operation The wound was treated by Carrel-Dakin dressing during the whole time he was in the hospital He left the hospital against advice

He was again admitted to the hospital two months ago because of a chronically discharging wound over the right leg Patient had been walking on this leg for three months before this present admission He had no pain and had good motion in the knee-joint

Physical examination showed a mass in the right groin, 2 inches in diameter, evidently due to swelling of the lymph-glands The rest of the physical examination was negative except for the right lower extremity, which showed the incisions for the old osteomyelitis and the draining wound over the tibia, which was still about 6 inches long by 2 inches wide, granulations were unhealthy and there was considerable purulent discharge There was also a draining sinus just above the external malleolus

The patient's temperature was normal on admission *x* Ray showed a sequestrum in the tibia with bone tunnels

A sequestrectomy was done seven days after admission and the old wound of the tibia was thoroughly debrided Old sinus tracts were exposed and overhanging walls of bone tunnels excised One month later a second sequestrectomy was done for cortical sequestrum and at this time Davis skin grafts were taken from the left leg and placed on the upper portion of the healthy granulating wound

Two weeks ago a first stage operation for tubular skin graft was begun taking the skin from the left thigh The second stage was done one week ago in which the upper portion of the graft was freed Patient is now to have the third stage operation of the tubular graft

In acute osteomyelitis in children an early diagnosis and immediate operation are of much greater importance than the early diagnosis and early operation for acute appendicitis This child if you will notice was ill seven days before admission We must educate the public and the profession to realize that any pain or tenderness in the region of a joint associated with fever in a child should immediately be admitted to a hospital and operated upon Any monarticular swelling in the region of a joint in a child associated with temperature leukocytosis and prostration is more apt to be osteomyelitis than acute articular rheumatism or other infection The diagnosis may usually be made by carefully palpating the bone in the region of the joint Pressure gradually increased will elicit an exquisite tenderness if not immediately then in a short time The fluid in the joint is usually secondary to the osteomyelitis

Hematogenous osteomyelitis in children arises by infection on the diaphyseal side of the epiphysis It is probably often due to emboli as the onset occurs frequently in a very short time after the primary injury We must realize that acute infections in bone differ from acute infections in connective tissue In bone the main blood supply comes through the nutrient artery and extends toward the epiphysis The epiphysis is well supplied by blood supply from the capsular and

epiphyseal arteries, but there is an area in the metaphysis (the connecting portion of bone between the shaft and the epiphysis) which is relatively avascular. The nutrient arteries enter the medullary canal in about the middle third of the shaft, divide, and proceed toward the two ends. In the metaphysis they divide into small branches and finally become end arteries, while on the epiphyseal side the same picture is seen of the epiphyseal vessels. There is a relatively avascular zone between these two systems. Emboli proceeding into the nutrient artery and settling in the small vessels of the metaphysis cause stasis and edema. As these vessels are enclosed in rigid bony walls it is easy to see how quickly this edema may cause necrosis and retrograde thrombosis.

Our immediate surgical indication, therefore, is the relief of this tension with as little trauma as possible Incision and drainage of the metaphysis without curetting or traumatizing any more than possible should be performed. If we curet the canal we may destroy the blood-supply and sequestration will inevitably follow.

Our error in treatment of this child in the original operation consisted in the fact that on account of the swelling extending up the tibia the preliminary operation was performed in the middle third instead of in the region of the metaphysis. This necessitated a second operation and further drainage. Following the course of his disease he developed a septic arthritis of the knee-joint This was first aspirated and found to contain a purulent fluid with Staphylococcus aureus. Two days later he was taken again to the operating-room. Lateral incisions were made on both sides into the knee-joint, a loose dressing was applied, with no drainage material He was put on active motion every two hours day and night, and, as you see, has perfect motion in his knee-joint with an excellent functional result.

He was readmitted to our service two months ago on account of several discharging sinuses over the lower third of his right leg The *x*-rays (Figs. 96–99) showed cortical sequestration with three bone tunnels

In chronic osteomyelitis it is necessary to obliterate as far

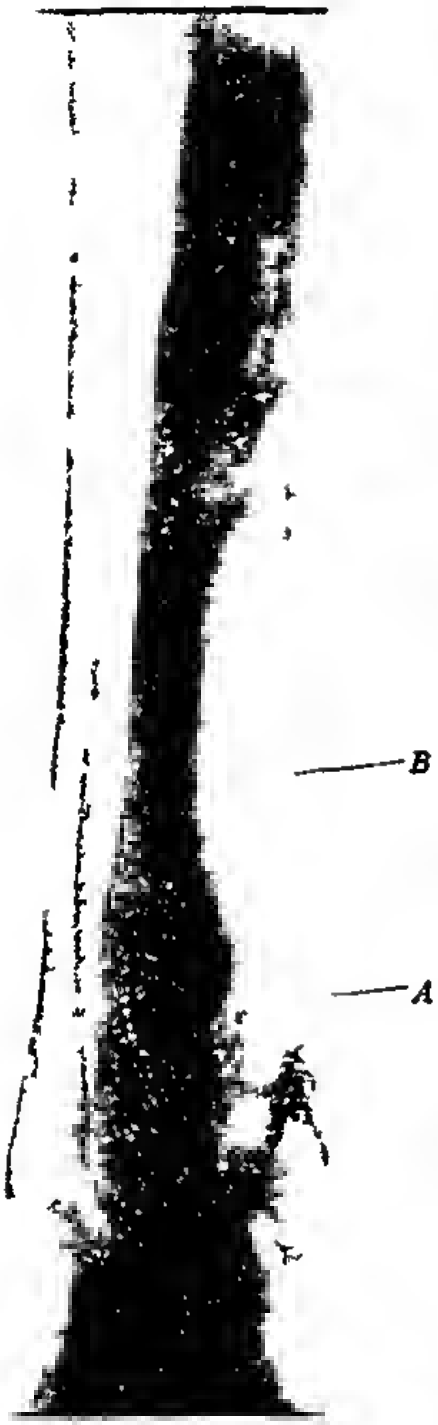

Fig 96.—Osteomyelitis of right tibia anteroposterior view *A* Sequestrum *B* Bone tunnel

Fig 97.—Lateral view showing bone tunnels

as possible all dead spaces In a dead space in connective tissue there are three factors which aid in obliteration first, pressure of the surrounding tissue, second, contraction of scar

Fig 98.—Postoperative results with obliteration of overhanging edges and bone tunnels Carrel tubes are seen overlying the bone

Fig 99.—Postoperative results with obliteration of overhanging edges and bone tunnels Carrel tubes are seen overlying the bone

tissue; third, ingrowth of granulation tissue But in bone cavities we have only the ingrowth of granulation tissue to obliterate

the dead space Granulation tissue can proceed only a certain distance in an infected field because as granulation tissue grows scar tissue forms at the periphery—the latter contracts and tends to shut off the blood-supply This explains why it is so necessary in chronic osteomyelitis to obliterate all dead spaces

Seven days after admission the patient was operated upon and the bone tunnels were excised and all overhanging bone chiseled away in order to allow the surrounding soft tissues to fall in and obliterate the dead space The patient was then dakinized

Our next problem was to cover the raw granulation areas with skin As you know, if epithelium grows over the tibia from the surrounding skin it becomes adherent to the bone, and any slight trauma will cause scabs and bleeding areas For this reason it was necessary for us to devise some method to shorten the child's convalescence and give him a useful leg On the upper third of our granulated surface three weeks ago we placed a number of Davis skin-grafts As you see, these have become united by epithelium The lower third of the leg however, immediately above the joint has a potential dead space It seemed advisable to throw a graft from the opposite thigh which would contain fat and skin to cover this raw area and obliterate this dead space Two weeks ago the patient was brought to the operating room the granulating area on the lower leg was measured and a flap of skin about 2 cm larger in all dimensions than the exposed area was separated laterally by longitudinal incision on the thigh (Fig 100) By undermining the skin on both sides of the graft it was possible to draw it together beneath our tube flap The lateral surfaces of the flap were then sutured together forming a tube covered entirely by skin and leaving a place of attachment at the upper and lower border Vaselin gauze was then placed between this tube and the closed wound of the thigh beneath it The following week the boy was again brought to the operating-room and the upper end of the tube which was to be eventually severed and thrown onto the tibia was dissected free and sutured back on to the thigh This was done to stimulate the blood-

supply from the lower portion of the graft which was to be the eventual pedicle. We are now ready to throw this tube over to the right leg.

I have made a cast which may be applied as soon as the operation is finished. We must, of course, so maintain position that no tension or strain will be put on the pedicle, for if blood-supply is interfered with here necrosis will result As you see, I have now separated the upper portion of the tube from the

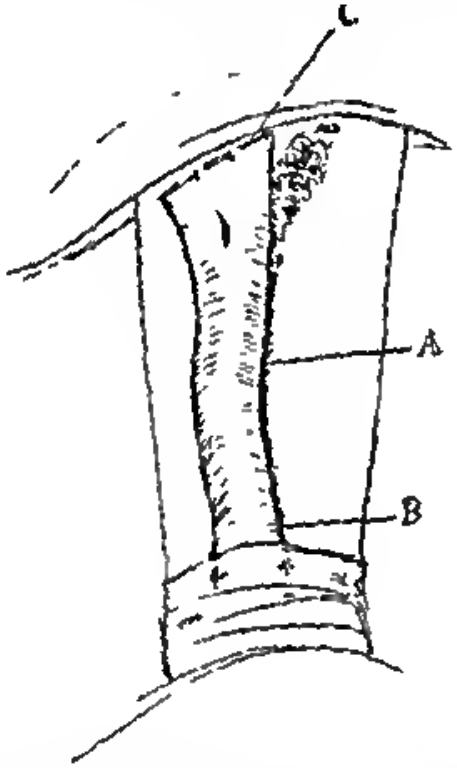

Fig 100.—Tubular flap before detachment of pedicle at upper end: *A*, Flap, *B*, lower and permanent pedicle; *C*, upper end of pedicle which had been detached at end of a week and sewn back in original place in order to stimulate blood-supply from lower pedicle

thigh. I am now opening it and making it instead of a tube a flat surface We will excise some of this scar tissue and fat on the inferior surface The next thing for us to do is to refreshen the skin edges bordering the granulating surface of the tibia. I am now suturing the flap to the skin of the leg with interrupted sutures, being careful, so far as possible, to control any ooze (Fig. 101)

In regard to after-treatment, I propose to leave this flap

attached for about ten days. I shall then place a rubber band about the pedicle to constrict its blood-supply and will allow this to remain for an hour The next day I shall repeat the performance, if there has been no sign of necrosis, and constrict it for three hours, and the next day for six. If the flap then

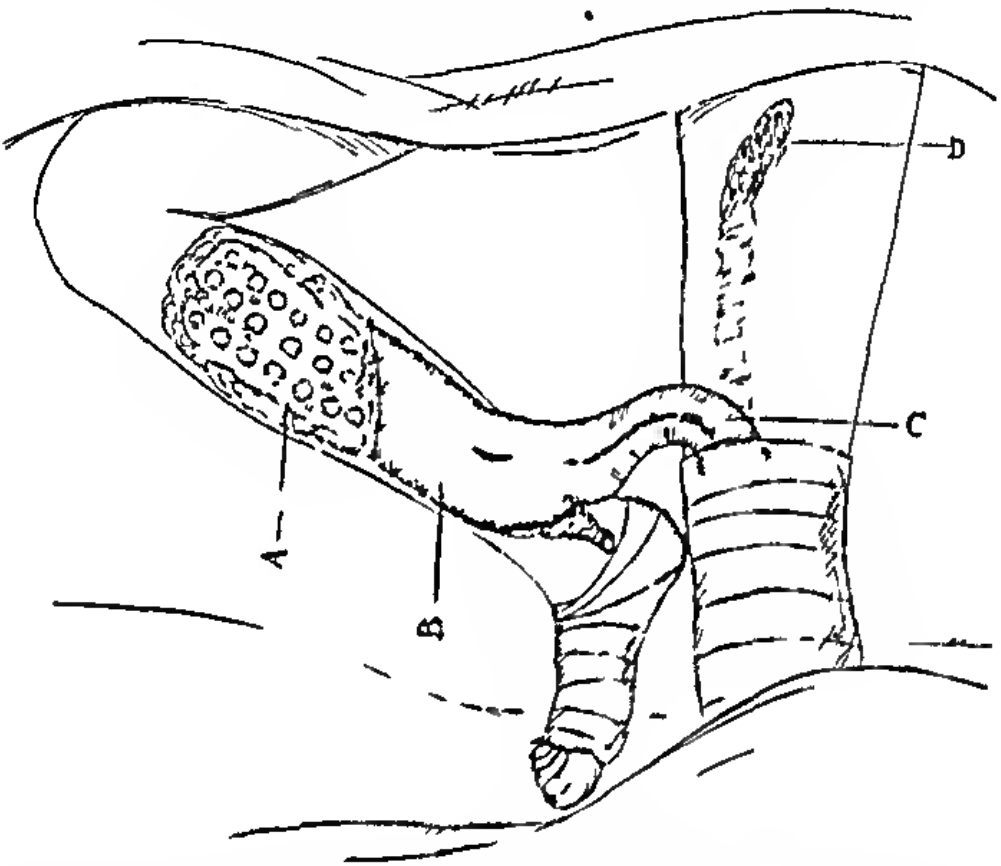

Fig. 101.—Tubular flap, after separation of upper angle and attached to defect in lower third of leg: *A*, Davis grafts with surrounding area of epithelium resulting from previous operation; *B*, flap sutured to defect; *C*, lower pedicle; *D*, raw area where upper pedicle had been excised from thigh

looks healthy, we shall bring the boy again to the operating-room, cut through the pedicle, and suture it to the lower angle of the granulating area.[1]

Before leaving this case I wish to review somewhat the

[1] One month later. This graft took perfectly, with the exception of a sloughing of about 2 cm. at the lower angle after the pedicle had been cut through This area was treated with Dakin solution and granulated rapidly. The child has left the hospital and at the present time is in good condition with epithelization proceeding over the lower area

rationale for the early surgical treatment of acute hematogenous osteomyelitis I am convinced that if operation is done early enough, and if no severe trauma is inflicted by the operative procedure, we may save these children an almost endless hospital stay, and resulting necrosis and sequestrum formation may be avoided Our procedure is to expose the metaphysis and open the subperiosteal abscess. Then, with a brace and bit we *drill into the medullary cavity. If the case* is operated on soon after the onset, and only blood and broken-down fat globules escape, this is all we do If, however, pus escapes through the holes, the cortex is removed for a distance of some 2 to 7 cm , allowing adequate surgical drainage. No curettage is performed, nor is packing inserted into the canal. We place Carrel tubes in the region of the bone, but not in the canal, in such a manner that the Dakin solution tends to fill the canal Great care must be exercised in later dressings, and one must be constantly on the lookout for secondary foci I found that most cases of osteomyelitis of the lower end of the femur or the upper end of the tibia form secondary abscesses in the popliteal space It has, therefore, been my custom at the preliminary operation to counterdrain through this area

CHOLECYSTECTOMY FOR CHRONIC CHOLECYSTITIS

This patient is a woman forty-two years of age who has complained of recurring attacks of pain in the right upper quadrant, radiating to the back She has vomited two or *three times during her attacks These attacks while severe* have never been as severe as are frequently seen with cystic duct obstruction due to stone. She has had belching of gas and nausea during the attacks Her differential diagnosis, I believe, lies between cholelithiasis and chronic cholecystitis The Lyons test shows epithelium and a moderate amount of leukocytes in the B bile We have found, as a rule, if cholesterin crystals are present in large quantity in the B bile there are apt to be stones, but if epithelium and leukocytes are found without cholesterin crystals, a cholecystitis is usually present

In the treatment of our cholelithiasis and cholecystitis cases

we must look to the future for further aids in diagnosis and prognosis While I am operating I have asked Dr Bernheim to tell us her results with the icterus index in the diagnostic field and the phenoltetrachlorphthalein test

THE ICTERUS INDEX

Dr Alice R Bernheim

For the past two years, here in the New York Hospital, we have been doing a test for the determination of the icterus index

The icterus index as the name implies is a measure of jaundice, and the test is a quantitative estimation of bilirubin in the blood

In 1847 Virchow showed that hemoglobin is the mother substance of bilirubin The destruction of worn out red blood cells goes on within the body as a normal process Hemoglobin is liberated and converted into bilirubin Bilirubin is the chief pigment of the bile and in 1900 Proscher found that it is a normal constituent of the blood in man In the fasting state it is the pigment which gives the blood serum its yellow color The greater the amount of bilirubin, the deeper is the yellow color of the serum

Since 1903 a number of tests have been devised for the estimation of bilirubin in the blood These have been, for the most part either too cumbersome or too inaccurate for clinical use *In 1921 Neulengracht devised a test which we use in a modified form* It is both simple and accurate It is one by means of which the depth of color of the serum may be expressed by a number This number is called the icterus index We have then, as a normal phenomenon, a bilirubinemia which can be measured We may also have a hyperbilirubinemia and a hypobilirubinemia

A hyperbilirubinemia occurs in disturbances of the biliary system, such as cholecystitis, cholangitis hepatitis, and in obstructions in the biliary passages due to adhesions or new growths It occurs in hemolytic conditions within the body, in which

the destruction of red blood-cells is over and above the normal, as in pernicious anemia, malaria, hematoma, rupture of a viscus.

We thought that it would be of interest to see what the bilirubin content of the blood is in the various conditions of disease, so we estimated the icterus index in 500 unselected cases We found some interesting groups and relationships which show the test to be of broader diagnostic value than was at first surmised.

First we determined the index in a large number of normal individuals, including Japanese, Chinese, Negroes, Italians, Spaniards, and fair-skinned people. We found that, irrespective of natural complexions, the normal range is from 4 to 6 We also found that in every case with an index above 15 clinical jaundice was present, and that in every case with an index below 15 clinical jaundice was not evident We have then a zone of latent jaundice between 6 to 15, in which the blood is able to hold an amount of bilirubin over and above the normal before spilling it over into the scleræ and other tissues. It is within this latent zone that estimations are of greatest interest. However, in cases of frank clinical jaundice, the test is also of value For often it is not possible, with the eye alone, to tell from day to day whether a jaundice is increasing, decreasing, or stationary. Jaundice disappears less rapidly from the tissues than it does from the blood

To the surgeon perhaps the application of the test is of most interest in those abdominal conditions of doubtful diagnosis. In 31 cases of cholecystitis and cholelithiasis with no history of jaundice the icterus index ranged from 7.1 in 1 case, 7 5 in 3 cases to 15, with an average index of 11 5 (normal 4 to 6). In appendicitis and perirenal abscess the index is normal.

In extra-uterine pregnancy, even before rupture of the tube, there is an extravasation of blood, and if this be large enough to form a palpable mass upon pelvic examination there is sufficient absorption of pigment by the blood to raise the icterus index Therefore this test may prove of value in differentiating ectopic pregnancy from other pelvic conditions from which it is sometimes difficult to distinguish it.

We have found the icterus index below normal: between 2.5 to 4 in 24 cases of severe secondary anemia due either to hemorrhage or depression of the bone-marrow. In this condition of hypobilirubinemia there are fewer red blood-cells, due to the anemia, yielding a diminished supply of hemoglobin in the normal process of destruction. therefore less bilirubin, consequently a low icterus index.

It has been thought by some observers that the anemia accompanying carcinoma, especially carcinoma of the stomach, is hemolytic in character, due to the destructive action of the toxins upon the red blood-cells. The yellow color, the blood-picture, and the achylia of carcinoma of the stomach frequently cause this condition to be mistaken for pernicious anemia and vice versa.

In 7 cases of carcinoma of the stomach the icterus index was found to be below normal, indicating a depression of the bone-marrow and not destruction of erythrocytes by the toxins of the disease. In pernicious anemia the index is high. Thus the icterus index is a differential point between the so-called primary and secondary anemias.

In cardiac disease, in pneumonia, typhoid, malaria, trichiniasis, diabetes, and other diseases the icterus index findings are of value either diagnostically or prognostically, but this is in the realm of medicine and is not of particular interest to the surgeon.

LIVER FUNCTION TEST

Dr. Alice R. Bernheim

We have done the liver function test as devised by Rosenthal in 48 cases. Ten of these were in normal individuals.

This test is based on the fact that the dye, phenoltetrachlorphthalein, when injected into the blood is excreted by the liver. A normal liver will remove the dye entirely from the blood in the period of an hour. A badly functioning liver fails to remove the dye from the blood in that period of time. The dye is injected—5 mg. per kilo of body weight—in a 1 per cent. solution. Blood is taken fifteen minutes and one hour after

injection In the normal individual 5 per cent. of dye is found in the blood after fifteen minutes; that is, the liver has removed from the blood-stream all but 5 per cent. of the injected dye.

In cases of cirrhosis and syphilis of the liver, in arsphenamin poisoning as much as 45 per cent. has heen found at the end of an hour. In one case of cirrhosis 80 per cent. of the dye was still present at the end of that period of time. In 3 cases of carcinoma of the liver the liver function was but slightly impaired but 5 and 7 per cent of the dye heing present at the end of an hour

This probably means that in cirrhosis the liver is fairly uniformly involved in the fibrotic process, while in carcinoma there may be areas of uninvaded tissue which carry on the functions of the liver so that the total function is but slightly impaired.

In 3 cases of chronic constipation 5 per cent. of the dye was found present at the one-hour period. It is only hy following such cases over a period of years that the significance of this finding can be estimated

Operation by Dr. Bancroft.—We shall make a right rectus incision in this case. A transverse incision has been occasionally used It gives an excellent exposure, but if infection occurs the hernia resulting is difficult to cure I have now exposed her gall-bladder. It is firmly adherent to the omentum and to the duodenum, which is drawn upward. The wall is thickened and I feel a nodular area which seems to be a stone.

This case presents the difficulties that arise when an operation is done on a case with recurring attacks of pain in the right upper quadrant of the gall-bladder with persistent tenderness at Murphy's point Frequently on entering the abdomen in these cases we find a gall-bladder not grossly diseased on external appearance The wall may he somewhat thickened and if we aspirate the gall-bladder we may find a rather thick turhid bile. What, then, should be our procedure in this type of case?

A number of years ago I analyzed 38 consecutive cases in which 6 cholecystostomies and 32 cholecystectomies were performed. The histories of these cases were analyzed, the

microscopic specimens of the gall bladders carefully studied and the late results in our follow up clinic summarized It was interesting to note that 75 per cent of these patients had either been operated on previously for some suppurative condition of the lower abdomen or had a definitely diseased appendix removed at the time of their gall bladder operation This tends to support Ewart Graham s theory that chronic cholecystitis originates from a primary portal vein infection which carries bacteria to the liver

In many of these cases there are areas of scar tissue formation of the liver in the region of the gall bladder which are the result of chronic infection It has been shown that some of the perilobular lymphatics of the liver extend into the muscularis of the gall bladder We therefore assume that chronic cholecystitis is of hematolymphatic origin Graham has substantiated this theory by experimentally producing cholecystitis in animals by injecting bacteria into the portal vein The microscopic study of the gall bladders removed showed in all cases an infiltration of small round cells in the muscularis and submucosa of the gall bladder Our great difficulty has been in attempting to determine what is a normal gall bladder in the human being Have all gall bladder involutionary changes as are found in appendices and are these round cells commonly present in relatively normal gall bladders?

I have attempted to study the gall bladders removed at postmortem but this is very difficult because digestive changes occur shortly after death Through Dr Symmers of Bellevue Hospital New York I was able to procure a number of gall bladders that he had obtained at autopsies in patients who were killed by automobile accidents and were autopsied almost immediately after death

Figure 102 shows the gall bladder removed almost immediately after death You will see that the villi are long and thin that the submucosa consists of numerous lymphatic channels and areolar tissue and that the muscularis is not invaded with round cells In summarizing the results of our microscopic studies in the above series it seems as if there were

probably two types of chronic cholecystitis—Type I, in which the muscularis and submucosa are infiltrated with small round cells, but in which the villi are relatively normal in appearance (Fig 103) Type II is the so-called strawberry bladder, with thickened knob-like villi containing cholesterol in large quantities, with ulcerations of the tips of the villi and scar-like formation of the connective tissue (Fig. 104). It is possible that these two types may be different clinical entities, Type I may

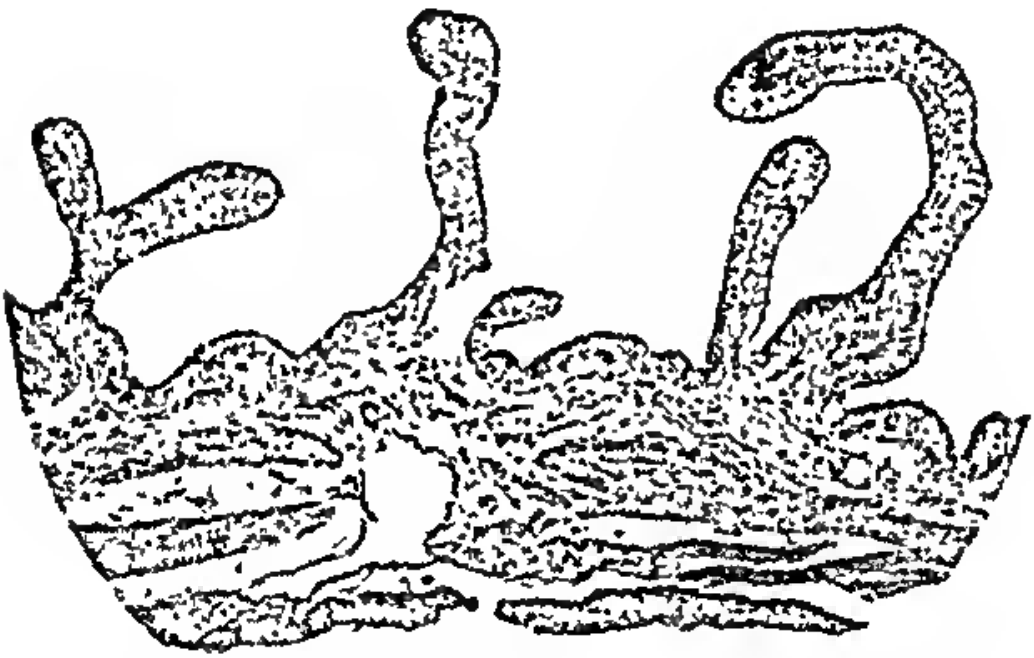

Fig 102.—Normal gall-bladder removed at autopsy of traumatic case shortly after death Thin stroma, narrow elongated villi, no round cells in muscularis

be of primary lymphatic origin, secondary to liver involvement, while Type II, with large lipoid deposits in the villi, may be the precursor of stones

Chauffard states that small biliary calculi were found to originate inside the villi as minute clusters of cells surrounded by cholesterol. He assumes that these are shed, that they increase in size and ultimately become faceted Boyd has shown that in cases of strawberry gall-bladder there is an ester of

cholesterol in the mucosa He found on clinical analysis that a normal gall-bladder contained 1 70 per cent. cholesterol, by weight, while the strawberry gall-bladder contained in the region of 50 per cent cholesterol by weight

In our follow-up study of these cases we were able to follow 37 out of the 38 The cases having cholecystectomies showed

Fig 103 —Round celled infiltration of muscularis and subserosa

88 per cent. good results, while the cholecystostomies showed only 50 per cent. good results Our basis for the classification of a good result meant absence of pain in the right upper quadrant, freedom from digestive disturbances, and ability to perform normal tasks. The conclusion that I have formed from my analysis of these cases is as follows:

If an individual, average age of about thirty-six, has suffered from right upper quadrant pain for a period of two or three years, if the Lyons test is positive, if on examination there is a persistent tenderness in the right upper quadrant, and if on exposure of the gall-bladder there is considerable thickening

Fig 104.—Strawberry gall-bladder, one year's duration Thickened knob-like villi with edema and ulceration of the tips. Cholecystectomy Good result

with enlarged nodes along the common duct, one is justified in performing a cholecystectomy, irrespective of how the gall-bladder appears One should analyze these cases thoroughly, because a cholecystectomy is an operation of some risk and should not be performed without due consideration of the

symptomatology and the lengtb of time that symptoms have persisted

I am removing the gall-bladder I am now isolating the cystic duct, and have exposed it so that I can pass a ligature around it alone I believe that it is advisable to dissect back

Fig 105 —Duration, one and a half years Numerous round cells seen in submucosa and muscularis Cholecystectomy Good result

the peritoneum and get a complete exposure of the cystic duct and not to pass the ligature around tissue *en masse.* The cystic artery lies slightly back of the duct and it is safe to do this without fear of injuring it. I shall next place a clamp on the artery and dissect the gall-bladder free, leaving a margin of peritoneum which I can close over the fossa. It is our custom

to drain these cases for thirty-six hours, as we believe that an occasional case of biliary peritonitis may be prevented by this procedure.

On opening this gall-bladder I find that there is no stone present, although I had felt something which I had assumed to be a stone. You will see that it is a typical strawberry gall-bladder There are the white elevations on a red background which are typical of the gross pathology of this type of case. I feel, therefore, that we were justified in removing the gall-bladder, although no stones were present.

ST LUKE'S HOSPITAL

Clinic of Dr Nathan W Green

Three Cases of Lung Suppuration
A Case of Epithelioma of the Esophagus Esophagoscopy.
Cholecystectomy.

EPITHELIOMA OF THE ESOPHAGUS ESOPHAGOSCOPY

I have three postoperative cases of lung abscess or suppuration to show you, and I wish to show the a rays first Then I have an esophagus case I would to have you see The man, A M , had an examination over a year ago I thought he had a cancer of the esophagus I did a gastrostomy on him of the Janeway type He wore a tube in place for a while, and for some reason he grew better Then he allowed his gastrostomy to close The *x* ray is typical of a malignant obstruction of the esophagus (Fig 106), and the examination led me to believe it was an epithelioma, but the subsequent history of the patient does not conform to the usual course of cancer He has gained some weight, and I am going to take a look down to see what his esophagus looks like It may be we shall find a smooth esophagus He is swallowing perfectly now, and is working again That might be called an apparent spontaneous amelioration, and if we had used radium on him, it might be counted as improvement attributed to radium It is interesting to see what the appearance is and to have a microscopic report in these cases, but in about 90 per cent of the esophageal cancers we are sure of the diagnosis without taking a piece out for examination —just from the appearance of the roentgenogram the ragged look of the esophagus, the bleeding when one touches it with a swab, and the progressive obstruction

I am rather interested in chest surgery, and the esophagoscope and bronchoscope lend themselves to chest surgery Cases

of lung abscess and of foreign bodies in the lung come to the one doing bronchoscopy, and diverticula and cardiospasms and benign and malignant stenoses of the esophagus are confirmed by the esophagoscope.

Most of the malignant esophageal cases do not live long. I believe Janeway had one he treated with radium that lived

Fig 106.—Roentgenogram taken September 13, 1923, by Dr. Le Wald, showing irregularity in the filling defect of the esophagus

about two years The patient became very anemic, and when last seen he showed some improvement, but of his subsequent history we lost track As a rule these patients do not last longer than about a year from the inception of the first symptoms. Some of them die from hemorrhage, and it is interesting to note what the hemorrhage comes from They die from a fulminating hemorrhage One of these cases of hemorrhage which

I had was autopsied and it was found that the hemorrhage came from the second intercostal artery which had been eroded right in the center of a cancerous ulcer He died with a profuse hemorrhage in a short time That case I published in the North American Clinics One point about cancer of the esophagus is that in most cases the growth is of a squamous epithelial nature The location of these growths is frequently at the bifurcation of the trachea and frequently at the cardia, and less frequently at the entrance of the esophagus

Cases of carcinoma of the lesser curvature simulate cancer of the esophagus, and cause obstruction by growing from the stomach up into the entrance of the esophagus If we take a piece out by a punch and examine it microscopically we may find a difference in the type of carcinoma, it being more of the cuboidal cell type That will give the hint that it comes from the lesser curvature The esophageal cancers are almost always of a squamous epithelial nature

This case, A M , was admitted to the hospital early in September, 1923 On September 20, 1923 a biopsy showed epithelioma of the esophagus We did a gastrostomy of the Janeway type, which is a very satisfactory kind, and which does not close up, as a rule, unless one makes a special effort to have it close

I clean all my instruments with green soap and water, and then soak them in 3 per cent formalin solution That will kill almost everything except tubercle bacilli I like very gently to pass a bougie first, and on that as a track insert the esophagoscope

QUESTION Are you using radium on these cases?

DR GREEN Not in this case, I have used it on some of them

QUESTION How about cauterizing them?

DR GREEN I have not tried it This bougie goes clear down through the esophagoscope into his stomach For some reason or other the obstruction has gone, and yet the diagnosis was made microscopically I will take the bougie out, and see if there is any bleeding If there is, there is still new growth There is That is one of the cardinal points in diagnosis If

one gets blood on his swab, there is an ulcer of some kind, and probably a new growth.

QUESTION. Have you any explanation to offer for the recession of this?

DR. GREEN: None at all, except that cancers differ in malignancy, even if of the same type.

THREE CASES OF LUNG SUPPURATION

These cases of chronic lung suppuration I have been very much interested in. The outcome of the earlier cases has not regularly been favorable, nor is it always so at the present time. One must know when not to operate. Small foci may recover spontaneously, and cases of diffuse suppuration may die the sooner from the added strain of an operation. I have confined my procedures to drainage, and by the two-stage method; or to an extrapleural collapse. In the drainage cases the first stage consists of a rib resection under local anesthesia with packing down on the parietal pleura with gauze. The second stage comprises opening the abscess a week to ten days later One enters the abscess through the new-made adhesions with a needle Following the needle with a director and spreading these two apart a little, one opens the abscess cavity with a cautery or by stretching the overlying tissue. Dr. Willy Meyer prefers to open the cavity with a cautery. I have been governed more or less by circumstances and expediency If one enters the cavity with a needle, and slides the director in on it as on a track, and follows the needle right down with the director, and separates the two, he will in all probability get a gush of foul-smelling air or pus Many of these lung abscesses have been and are connected with a bronchus. When we get one opened somewhat with the director and the needle, we go in with the forceps and stretch the overlying tissue Of course the danger is hemorrhage. Theoretically the cautery is the best, but I think the danger from hemorrhage is almost equal whether one burns through the tissues or pushes the vessels aside at first. Spreading the tissues followed by the cautery seems a good combination.

I try to keep the tract open just as long as it will stay open If it shows a tendency to close it is practically useless to try to keep it open longer I have one woman from New Haven whom I treated in this way I could not keep it open more than five and a half months, so I took the tube out, the sinus closed at once and she gained 20 pounds in a short time with no re-accumulation of fluid She had a large irregular abscess cavity in the upper lobe

These suppurative cases have had the sputum examined for tubercle bacilli Of course, if tuberculosis is present, I do not like to operate Those shown today have proved not to be tuberculous Some of my cases have been previously sent away to tuberculosis sanitaria, where they have remained for a period of months, and finally come out still coughing up pus They have had hemorrhages, and yet the sputum has been tuberculosis free

The difference between lung abscess and bronchiectasis is one that is rather difficult to determine Bronchiectases are generally more diffuse, as seen by the roentgenogram The cavities are more irregular and multiple The frank lung abscess generally has one, two or three cavities I have one now under observation that had five cavities, all showing fluid level The more cavities they have, the less the probability of a complete cure This case just mentioned had a second and third rib taken out and is wearing a big retention catheter emptying into a bottle, which he wears under his clothing He is working and is somewhat better, but he has to be dressed every other day Personally, I think where an extensive lung abscess has caused destruction of a lobe with many adhesions present around it, I cannot do the patient justice in trying to do a lung resection I think a "live dog is better than a dead lion" and for that reason I have not tried to do more than drain such a case Dr Howard Lilienthal[1] has a series of cases of lung suppuration with resection, with brilliant results, and yet his mortality was not inconsiderable Latterly Dr Evarts A Graham, of St Louis, has devised a way of destroying the lung lobe by cauterization and

[1] Annals of Surgery, 1922, lxxv No 3

packing, and I think this bids fair to be very hopeful in some of these cases of multiple lung abscess in a single lobe. It is a good thing to watch these lung abscess cases for a number of weeks to see if they are going to make a spontaneous cure Some of the smaller ones will do so. Some cases have evidently been superimposed on a gumma of the lung, and a Wassermann may be advisable before attempting any surgical procedure.

Fig 107 —Roentgenogram taken April 18, 1922 This picture shows a fluid level (patient on her side) and iodoform gauze packing after first stage The gauze packing appears to be anterior to the cavity in the stereoscopic films

A number represent primary lung carcinoma Dr Yankauer has called attention to this

One has to act cautiously and conservatively, and, of course, the thing to desire is a living patient We cannot always cure these patients completely, but we can relieve them considerably Some of them recover with a "lip" fistula, this they can dress themselves The only disadvantage these people have is that of a dressing, and the necessity of caution about going into

the water, because they may drown by getting water into the lung through the fistula Some years ago Professor Shafer, of Edinburgh, made experiments on a number of dogs. He found that a very small quantity of water in the trachea produced death by drowning It was not a soggy condition of the lung produced, but evidently it was the diaphragm of froth that

Fig 108 —Showing fluid level in lung abscess

rose up and down on the respiratory air that prevented the interchange of oxygen and caused the drowning of the dog. So in these cases of bronchial fistula, one has to be careful that they do not get a movable diaphragm of bubbles and froth in the trachea that precludes the proper exchange of air, and which might asphyxiate them.

D. N. *This is the case of a woman who was admitted* in April, 1922, three weeks after a tonsillectomy. By the roentgenogram (Fig 107) she presented an abscess cavity with fluid level More pictures were taken after the first stage of the two-stage operation The abscess was opened by the two-stage process, having taken out the second rib It drained through a tube for a number of weeks The tube was then removed, and the sinus closed without reaccumulation of fluid. *She is now well, has been married, has gained 50 pounds, and* has had a baby since the operation

A L This case is a man who was admitted on January 1, 1922 Following an operation for gall-bladder disease at another institution he gave symptoms of lung suppuration

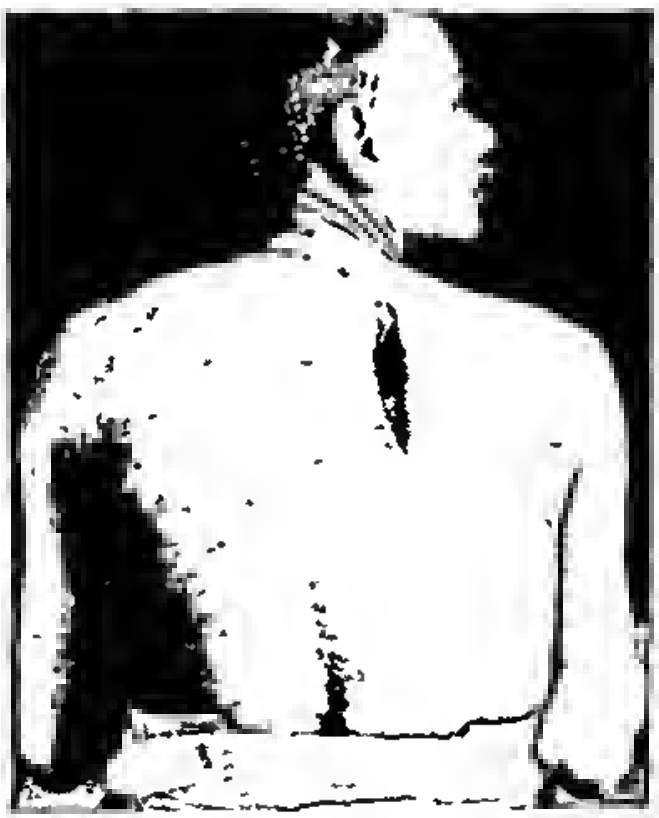

Fig 109.—A L This picture shows the appearance of his wound three months after the two-stage operation for drainage

for three months His sputum, when examined by the Department of Health, was negative for tubercle bacilli. The roent-

genogram taken by Dr LeWald (Fig 108) shows an abscess cavity with fluid level The sputum had the characteristic odor The case was referred by Dr D E Ehrlich The two stage operation for drainage was done parts of two ribs being removed and the lung opened with the cautery He has gained

Fig 110—Roentgenogram taken May 15 1922 (over three months after two stage operation for lung abscess) Abscess cavity cannot be detected and no fluid level can be seen (Dr L T LeWald)

25 pounds since the operation He wears a belt for a ventral hernia following his laparotomy for gall bladder disease (Figs 109, 110)

J W This patient was admitted on May 17 1920 with a history of cough and expectoration of purulent material for nine

years. At the age of five he had a severe attack of whooping-cough, following which he began to have a persistent cough. Since he can remember he has coughed at intervals three or four times a day, usually brougbt on by change of position. His right lung showed an area of dulness and diminished voice On May 18th a roentgenogram was taken by Dr. LeWald,

Fig 111 —Roentgenogram taken December 11, 1920 by Dr. LeWald, after partial resection of sixth and seventh ribs

and no fluid level was detected He was bronchoscoped twice at about that time, and pus was seen coming through granulations in the lower right bronchus Early in September, 1920 his right pleural cavity was explored The lower lobe was found collapsed, and it did not crepitate on pinching. There were a few adhesions The lobe was sutured to the chest wall,

and as some pus escaped during the suturing about the stitch holes, a drain was placed in the dead space below the lower lobe Late in September, 1920 an attempt was made to drain the abscess cavity, the fifth sixth, and seventh ribs having been resected subperiosteally More *x* ray pictures were taken and one by Dr DeWald on December 11, 1920 (Fig 111) noted a partial collapse of the right lung with pleuropericardial adhesions and air between the margin of the lung and the chest wall He was readmitted on April 25, 1921, and gave in his interval history the fact that he coughed up a pin shortly after his operation in the previous September On April 26, 1921 a bronchoscopic examination was made a bismuth and paraffin mixture (20 per cent) was placed in the cavity and an *x* ray picture taken (Fig 112) This was again repeated later with no untoward effects In February, 1923 he had an attack of acute appendicitis, and was admitted to the hospital for operation In July, 1924 he again came into the hospital with a history that he had been gaining weight since his operation on the bronchiectatic condition, but that every eight hours he spat up nearly ½ pint of yellowish green foul smelling material, and had occasionally coughed up a little blood after violent exercise On July 21, 1924 an *x* ray picture was taken of the left chest by Dr Percy Brown On July 22 1924 the first stage of a three-stage operation for extrapleural pulmonary collapse was performed A posterior vertical incision was made, removing parts of the seventh, eighth, ninth, and tenth ribs The trunks of the intercostal nerves were injected with alcohol The second stage of this operation was done on August 5, 1924, and an anterior incision, more or less vertical in direction was made, removing parts of the sixth, seventh eighth, and ninth ribs for about 3 inches On September 3 1924 the third stage of the operation was done, removing the intermediate portions of the seventh, eighth, and ninth ribs, and part of the sixth rib

The sputum was negative for tubercle bacilli and for spirilla

Fifty five days after the first stage of the operation, forty-one days after the second stage, and twelve days after the third

stage of the operation he was reported as having his discharge improved

These are all the lung suppuration cases that I can show you this morning.

This is the method that Dr Hedblom used in Rochester, Minnesota; he lays much stress on injecting the intercostal

Fig 112 —J W , fifteen years Picture taken April 26, 1921, after injection of bismuth through bronchoscope

nerves with alcohol, because these patients have to go through three operations, possibly more, and if they have no pain after each operation following the injection of the nerve trunks with alcohol, they are more apt to submit to the necessary number of stages of the operation If they have to be continually hurt,

it grows more difficult to persuade them to submit to the necessary stages to cure them

I think this last case I showed you will go on more and more to a cure as he continues his postural drainage and grows older While he was in the hospital he lost 20 pounds but he has now gained 23

QUESTION Were the anterior and posterior incisions made at different periods?

DR GREEN They were at least ten days apart

QUESTION Are you likely to get regeneration where you cut the ribs?

DR GREEN Not in ten days I have also made an attempt to take out the periosteum of the rib so that it would not regenerate If we do not take it out I have tried to scrape it or touch it with some chemical that prevents it regenerating I had one case a little boy where I was able to take out the ribs with the periosteum I have not seen him for a number of years, but he was only spitting a dram of pus every day

QUESTION What is your postural treatment?

DR GREEN With the little boy we used to play "wheel barrow," *i e* take him by the legs and let him walk about on his hands The older patients invert themselves by lying across the bed with the head near the floor

QUESTION Have you tried suction through the bronchoscope?

DR GREEN In some but not as a curative measure Dr Yankauer has done that, he puts in fluid and sucks it out as *fast as it goes in It is a highly specialized procedure and unless* one has everything set up for it it is hard to accomplish it satisfactorily

CHOLECYSTECTOMY

This patient is a man of sixty one years He was sent to another institution with a diagnosis of cancer of the stomach, and there he was thoroughly *x* rayed The roentgenologist said he had no carcinoma of the stomach He had a distortion of the duodenal cap and tenderness in his right upper quadrant. He has a history of intermittent jaundice At the present time he has a higher bile index than normal in the blood In all

these older cases of people over forty, where we have an idea that they are piling up their blood urea nitrogen, we are having the percentage estimated as a routine procedure. We are also having the phenolphthalein test made so that we are able to know the contraindications for operations and to reduce the operative mortality thereby In some cases here our medical service has been trying out these gall-bladders first for the normal functioning gall-bladder, the theory being that a normal functioning gall-bladder will show a shadow in the *x*-ray if there is an injection into the vein of 40 c c of a 9 to 12 per cent. solution of tetra-brom-phenolphthalein in divided doses It is understood that in abnormal gall-bladders the shadow does not show That I believe has been worked out by Dr. Evarts A Graham, of St Louis In this case I have asked Dr. Brown, our roentgenologist, to have a picture taken, thinking that there might be calcified gall-stones present.

We cannot rule out the possibility of carcinoma of the head of the pancreas or at the pyloric end of the stomach, yet the patient has given a definite history of intermittent jaundice and epigastric discomfort lasting over a period of time longer than generally obtains in the history of carcinoma of the stomach. That usually does not cover more than a year until the case is plain, but this has gone on for two years. The patient has pyorrhea and has lost some weight (In almost all my stomach carcinomata there has been a history of pyorrhea and a history of extreme weakness There is, of course, also the anorexia and consequent loss of weight The two outstanding things are the extreme weakness and the pyorrhea) The question arises what to do in this case We want to do as little surgical harm as we can, and yet relieve him of his symptoms

QUESTION. What is the explanation of the pyorrhea?

DR GREEN. What relation pyorrhea has to carcinoma of the stomach I do not know; I am simply observing that most of my carcinomata of the stomach patients have pyorrhea. They may have bad teeth and swallow big pieces of food, unchewed, and the gastric hydrochloric acid may not digest the food, which gives a chronic irritation at the pyloric end of

the stomach accompanied by pyogenic cocci It is recognized now I believe among gastric specialists that accessory sinus trouble with pus may give one a degree of gastritis These patients frequently complain of epigastric distress and heart burn The idea is to clean up all foci of infection that are pouring pus into the stomach and then the stomach condition may improve that is if it has not gone on to carcinoma

I do not think that this patient has carcinoma of the stomach but rather gall stones I do not think he has shown a definite Charcot s syndrome that is intermittent jaundice with chills and pain He has some distress and indigestion and a history of intermittent jaundice

QUESTION Have you used calcium chlorid intravenously in these gall bladder cases?

DR GREEN I have not We determine first whether the clotting time is within the range of normal and if it is not, we put the patient through a course of medical treatment before we operate on him

After opening the abdomen This patient has a certain amount of enlargement of the liver I think it is a cirrhotic liver, but there is no carcinoma nodule that I can feel The only pathologic finding is this gall bladder and the enlarged liver The liver may be large from infection My recollection is that Dr Charles Mayo has said that the liver not only secretes bile, but acts as a lymphatic gland and whenever there is infection in the abdominal viscera it may enlarge I do not feel any enlargement of the head of the pancreas The gall bladder empties by pressure The foramen of Winslow is a little small There is a small stone in the gall bladder that jumps around The common duct is a little dilated There is no definite obstruction although the common duct seems to be larger than normal As one clamps the cystic duct and the cystic artery there is a little bleeding back from the gall bladder There is a little indefinite obstruction here although a probe passes $2\frac{1}{2}$ inches down and apparently into the duodenum, the only thing to do after the gall bladder is removed in this case is to put a tube in and drain the common duct This tube

goes right through the cystic duct into the common duct. The obstruction seems to be very moderate. I fancy the obstruction is from the inflammation concomitant with the cholecystitis rather than from any stone, and that it will entirely disappear as the inflammation subsides.

QUESTION: Will you get drainage of bile through there?

DR GREEN: Yes, because it goes into the common duct. We do not get more than 8 or 10 ounces of bile drainage a day as a normal thing, although the average secretion of bile is in the neighborhood of 50 ounces. The tube ought to come out in about eight days.

QUESTION: Did you take a stitch through the tube?

DR GREEN: No, I did not. There is the tract where the gall-bladder lay, there is the common duct; there is the cystic duct, and this tube goes right into the common duct. I would like to put a drain down into Morrison's pouch. In a cholecystectomy with ligation of the cystic duct I never like to close the abdomen without drainage. Dr John McCreery at the Surgical Society recently showed a spontaneous rupture of the common duct unrecognized for some time. When the abdomen was opened it showed an accumulation of bile with fat necrosis and a good deal of chronic inflammation I think the same thing might occur occasionally if we closed cholecystectomy cases up without a little potential safety-valve. When I was in Rochester six years ago my recollection is that they were draining them all. Now I believe they are closing most of them up primarily. However, I do not quite have the courage to close them up without drainage, and I feel a great deal safer if there should occur leakage of bile

QUESTION: How long do you leave the rubber-dam in?

DR GREEN: Five days. You see the lymphatics along the common duct are enlarged by inflammation, and there is no reason why the liver should not be enlarged by inflammation. In closing up these cases we always put in these silkworm-gut retention stitches I feel safer with them. They will not come out until about the fourteenth day, because the patient is an elderly man, and has not the same repair as younger patients.

BELLEVUE HOSPITAL

Clinic of Dr Howard Lilienthal

DRY CLINIC ON SURGICAL DISEASES OF THORAX

I shall exhibit to you today some patients and slides showing conditions following operations for the relief or cure of suppurative diseases of the lungs In addition there will be two lantern slides illustrating the result of an extrathoracic operation for an intrathoracic condition—angina pectoris

Case I. Suppurative Pneumonitis with Bronchiectasis Lobectomy.—My first patient is this well developed man of twenty six Without his disrobing you will not observe any abnormality in his figure or in the movements of his torso, yet ten years ago I removed the middle lobe of his lung together with a part of the upper and part of the lower lobes, resected in one block, leaving a hollow as large as a good sized adult fist He had had pneumonia, and thereafter there developed not the usual abscess with its cavity and fluid level line so frequently seen in the *x* ray picture, but instead there were multiple minute points of suppuration which may be described as suppurative pneumonitis with secondary bronchiectases He had been very ill for many months, spitting enormous quantities of foul pus After observation on the medical side of Mt Sinai Hospital he was referred to me by Dr Morris Manges for operation This was undertaken after bronchoscopy had been performed by Dr Yankauer, who found dilated secondary bronchi of the middle lobe, the lower branch also discharging pus During the operation general anesthesia administered by Dr Branower was employed, all preparations having been made for positive differential pressure by the intratracheal

method, so that the lung should not collapse as soon as the pleural sac was opened On entering the chest through a long sixth interspace incision a most unusual condition was found As a rule in these cases adhesions are few in number and may be absent even after years of pulmonary infection, but here the entire pleural cavity had been obliterated by what looked like areolar tissue, so that for the remainder of the operation no

Fig 113 —Case I, before operation Shadow represents disease of middle lobe with involvement of adjoining parts of upper and lower lobes (Annals of Surgery)

positive pressure was necessary, the patient breathing quietly throughout

The affected portion of the lung was identified without difficulty because of its dark appearance and its solid texture With the aid of the rib spreader a good exposure was secured, and it was then seen that the disease occupied the middle lobe and that the process extended into the two adjacent lobes as well

Ligatures of chromicized catgut were applied chain fashion, and the entire diseased area having been included, the resection was completed

He made an excellent recovery, passing, however, through the usual postoperative suppuration which I believe in the present state of our surgery to be unavoidable in these cases. In spite of the general synechiæ a sacculated empyema developed

Fig 114.—Case I, ten months after operation Now, ten years later, all shadows have disappeared (Annals of Surgery)

and was drained in front. Six months after the operation he foolishly played a game of baseball, which resulted in an abscess at the site of the scar. This was easily evacuated and the patient has remained well ever since. A few days ago I tested his vital capacity and found it to be normal. It is not feasible to make this test before operation in all of these cases because the necessarily forced inspiration brings on a fit of coughing and expectoration.

This method of exposing the interior of the chest by means of a long intercostal incision without cutting a rib can be employed to the greatest advantage in cases in which there has been no chronic empyema. I used it frequently when working in an evacuation hospital in France during the World War. In closing the wound the ribs can be easily drawn together by pericostal sutures, and by everting the intercostal structures the pleura is brought in contact and quickly adheres. When drainage is desirable it is best secured by the resection of a small piece of one of the lower ribs posteriorly. This method of exposure is not suitable when the pleura is thickened or fibrotic, for the ribs cannot be easily separated. It is then necessary to supplement the intercostal incision by the division of several ribs behind their angles.

This is a perfect example of recovery from an otherwise hopeless condition. There is no cough, no expectoration, and the patient may be considered absolutely normal except for the scar on his chest and the absence of the resected part of lung.

Case II. Suppurative Bilateral Bronchiectasis: Bronchostomy.—The case of this patient presents another method of treating pulmonary suppuration of the bronchiectatic type. As you see, he is an athletic man in his twenties. The lesion was a bilateral one, both lower lobes being affected. The diagnosis was postpneumonic bronchiectasis with suppurative pneumonitis, and the *x*-ray examination also demonstrated a small cavity on the left side, part of which was behind the heart. The sputum was profuse—from 8 to 16 ounces daily—and it was extremely fetid Anaerobic culture disclosed gas-producing bacilli and Gram-positive cocci in long chains Bronchoscopic lavage had been practised a number of times without much improvement. A single dose of Weinberg's anti-lung-gangrene serum had been intravenously injected, with only temporary improvement. This serum had been kindly furnished me by its discoverer from the Pasteur Institute in Paris. Under its influence the fetor disappeared for a few days, but the quantity

of expectoration was undiminished The man was incapacitated and miserable although his nutrition and muscular condition remained good It has been stated that bilateral pulmonary suppuration forbids surgery but not only is this not the case but it appears to me that a bilateral disease sounds a more urgent call for operative relief than when the lesion is limited to one side Lobectomy of course was here out of the question but by draining the abscess and if possible producing a bronchial fistula for aeration the outlook did not appear hopeless Willy Meyer has pointed out that the aeration of portions of the

Fig 115 — Close up of an artificial bronchial stoma

bronchial tree could be accomplished by this means when no air could reach the affected branches by way of the mouth I performed the first stage of this operation on March 6 1923 in local anesthesia resecting the eighth and ninth ribs posteriorly entering the thorax and bringing the lung to the surface packing it there with gauze In the next procedure ten days later the abscess was opened and we were fortunate enough to enter a good sized bronchus A large packing of rubber dam was laid in the cavity in order to prevent collapse Healing went on uninterruptedly and he was discharged to his home in Poughkeepsie and during convalescence was attended by Dr

Sadlier. One day after a violent strain an acute tense valvular pneumothorax developed which Dr Sadlier was able to relieve by aspiration.

The result in this instance has been most gratifying. The patient has gained many pounds, has been working steadily, and his vital capacity is far above normal

In another case of bilateral bronchiectatic disease in my service at Mt Sinai Hospital, in which the patient, a large finely developed man, had become emaciated and septic and had been given up for lost, a bronchostomy in the right back on the worst side was performed by Dr. Harold Neuhof There was recovery from the operation, and so far as *x*-ray appearances could indicate both chests became almost free from disease. The discharge from the bronchostomy was only a few drops of mucus—no pus—every day. Long after this man was well able to work he permitted his wife to support him, making the excuse of the hole in his side

Case III. Total Bronchiectasis, Right Side: Extrapleural Thoracoplasty.—When this boy, nineteen years of age, came to me in February of this year I had never seen a more depressing case For years his disease had persisted Its cause was unknown, but probably it had its basis in a congenital condition of dilated bronchi He was miserable and his appearance indicated his state of mind His skin was the seat of generalized acne He was emaciated His breath was foul He made an impression of having long been an outcast from society. On attempting to blow into the spirometer there was an attack of coughing with an immediate flooding of all the objects within range with many ounces of excessively fetid liquid pus It took all the rest of the day to clean up after him, and it was longer before the taint of his presence was gone. His general resisting power, however, appeared pretty good He was able to be about and to do a certain amount of work. There was occasional fever, but no history of chills The distribution of the disease as shown by the *x*-ray was such that only the complete removal of the right lung could have promised an absolute cure. The opposite

chest was clear, a circumstance which, in spite of its frequency, always strikes me with amazement With a view however, to corroborating the observation I requested Dr Yankauer to examine him with the bronchoscope This revealed pus from all the main bronchial divisions on the right side Dr Yankauer practised lavage but after the session there was a terrifying reaction with high fever (105° F), rapid pulse, cyanosis and

Fig 116—Case III Generalized unilateral bronchiectasis Final result after paravertebral resection of ten ribs

apparently the danger of a quickly fatal termination Thinking that a second bronchial lavage would be better borne, the procedure was repeated in a few days with a reaction as bad or even worse than the first one I was driven to the conclusion then that only an extrapleural thoracoplasty could do any good in this case I feared to practice artificial pneumothorax because of the great danger of pricking this diseased and probably adherent lung, producing the peculiarly dangerous empyema

following infection by anaërobes. General anesthesia was out of the question because of the copious sputum which could not be even temporarily reduced by postural treatment, and therefore I operated in local anesthesia, removing sections of the ten ribs including the first. The result was little short of miraculous The cough almost immediately ceased; there was a rapid gain in weight, and a total gain of about 40 pounds up to the present time. You see that the skin is now clear. He is again a happy member of society He is not absolutely cured, because by postural treatment once a day there is a discharge of about 1 ounce of non-odorous pus The rest of the day he is well. Dressed in his ordinary clothing the deformity following the operation is scarcely noticeable. Stripped, as you see him, the chest is greatly flattened and its capacity reduced.

The problem is different in tuberculosis, for which this operation is usually performed, from that of pulmonary suppuration Tuberculosis tends to get well with comparatively slight reduction in the size of the thorax so long as there is complete rest from the motions of the lungs In chest suppurations it is much more important to get rid of the discharge by coughing or posture than in tuberculosis In this case, however, there is so much reduction in the size of the thorax that we have a true compression and probably an obliteration of most of the suppurating area

Case IV. Bronchiectatic Abscess of Lung Following Tonsillectomy; Exploration of Thorax and Drainage of Abscess; Permanent Bronchostomy.—In this young woman we have another example of a lung suppuration following operation for the removal of the tonsils When she came to me she had been ill for six months with the usual disgusting symptoms characteristic of this disease An *x*-ray examination revealed a lesion which probably involved part of the upper and part of the lower lobe in a single abscess cavity which displayed a fluid level. An exposure in the transverse direction indicated that the cavity lay well posterior. It was important that I should know, however, whether there might be another abscess, per-

haps hidden by tbe cardiac shadow or by the sbadow of the abscess itself, and also what the condition of the neighboring lung migbt be, let alone the presence or absence of adhesions which might determine the best point at which to enter the chest. I have usually found that a long intercostal incision with the use of a rib-spreading retractor adds *little* or *nothing* to the risk of the operation and yields accurate information on the points just mentioned. This case was no exception to the rule. On examining the interior of the pleural cavity the abscess was easily demonstrated with a broad contact posteriorly with the parietal pleura. The lungs were distended by intrapharyngeal air-pressure and the long thoracotomy wound closed witb sutures around the ribs (pericostal stitches) and others to bring together the muscle and fascia planes and the skin. Before closure, however, two ribs were resected, with their periosteum, exactly over the abscess The suppurating cavity was, however, not opened at this stage, but its wall which presented was packed with rubber-dam covered by gauze, and a few days later this was removed and the pus evacuated with resection of a portion of the pyogenic membrane which formed the confines of the abscess. Drainage with rubber-dam and later with extremely soft-rubber tubes of virgin gum led to a rapid recovery. A large bronchus formed one of the outlets of tbe abscess, and this has been permitted to remain open for safety. I bave suggested performing an operation to close it, but the patient feels so much safer with this opening that she is loath to consent to anything which might even remotely threaten ber present satisfactory condition

Case V. Lung Abscess and Bronchiectasis Following Pneumonia; Pneumonotomy and Bronchostomy.—The fifth patient whom I shall exhibit today is this man of thirty-four, Frank McC. The symptoms of postpneumonic lung suppuration had been *in* evidence for *more* than seven *months*. The expectoration was profuse and fetid. There had been numerous severe hemoptyses. For a time his life had been despaired of. When he came to me he was in a state of panic. There had

been great loss of weight, although he was not extremely emaciated. I operated upon him in May, 1923 in two stages. At the first, three ribs were resected posteriorly, making a good-sized window, and gauze packings were employed to produce adhesions This operation had to be done in general anesthesia, which was carried on with the greatest difficulty, the patient becoming cyanotic and rigid. I employed a device which I consider valuable when there is a profuse discharge, and the danger exists of infecting the opposite lung Before the operation but after the anesthesia was complete I inserted through the trachea down to the bifurcation a rubber tube with many perforations Throughout the operation, although he was taking the anesthesia by inhalation, suction was practised through this tube and much bloody pus was evacuated. The wound was closed without drainage, burying the gauze packings. Two days later I removed the sutures and part of the gauze. Then I punctured the extremely indurated pulmonary tissue to a distance of about 3 inches No large pus cavity was entered —only what appeared to be one or two small bronchi. I have a great fear, however, of cerebral air embolism in procedures of this kind upon indurated lung, therefore, after spreading the wound, it was packed and the patient sent back to bed Two or three days later when the packings were removed a good-sized opening had become established in one of the larger bronchi. During convalescence there were a number of severe hemorrhages both from the wound and by hemoptyses, but gradually improvement became manifest, and finally there was complete healing. As you see him today his cough has disappeared, he has gained 50 pounds, and we may record a remarkably good result which could not have been predicted. The scar which you see gives but little idea of the actual size of this wound, which was very great.

I never regard any of these cases as completed until at least a year has gone by following the healing of the wound Exacerbations may occur months after the patient appears to be soundly healed, but they rarely are as serious as the original condition, and if pus forms it is pretty apt to find its way out at the site of the wound.

In this instance we may ascribe the fortunate result to two factors: first, the changed pneumatic conditions on account of the large thoracotomy which permitted a certain degree of collapse of the affected lung, indurated though it was; second, the bronchostomy, which brought about aëration of a part of the air-system to which air could not have had access by way of the mouth because the tubes were constantly filled with discharge. Pneumothorax in these chronic cases rarely if ever does any good, although the mechanics of the thoracotomy is somewhat similar.

Case VI. Pulmonary Tuberculosis; Pleuropulmonary Fistula; Mixed Infection; Empyema.—My next patient is this man of thirty-one who would seem never to have been ill in his life. When he has removed some of his clothing you will see, however, that he shows evidences of much surgery. Although he is not yet entirely well I am glad to present him in such good condition. His disease was right pulmonary tuberculosis involving the entire lung. There had also been a trace of tuberculosis at the left apex, but this had become quiescent. When I first saw him he had been ill for more than two years and had been a patient at the Loomis Sanatorium, where he received the best modern hygienic treatment to combat his phthisis. Therapy by artificial pneumothorax had also been applied with, at first, considerable benefit. Later there developed a small bronchial perforation into the pleura from which a mixed infection entered. This was combatted by the employment of antiseptics through the pneumothorax needle, and the presence of the bronchial fistula was clearly demonstrated when the patient expectorated some of the aniline dye which had been injected into the pleura. Before proceeding with the thoracoplasty I made an attempt to withdraw the fluid which had been demonstrated in the radiograph. I found, however, that even with a large needle the material was too thick to be sucked out. It was almost putty-like in consistency. Thereupon I proceeded with the thoracoplasty, employing general narcosis with nitrous oxid and a little ether, because the patient refused to be operated upon in local

anesthesia. After the operation, at which nine ribs, including the first, were resected, there came the complication of a dry pleurisy on the opposite side, but, fortunately, this cleared up, and it has not been proved that it was tuberculous in character. The patient did well and went back to the sanatorium at Loomis, but later the pleural process in the right chest took on a more

Fig 117.—Case VI, following paravertebral thoracoplasty for tuberculosis. Position upright. Arrow points to an air-chamber, the result of a pleuropulmonary fistula. The level line of fluid (pus) as it looked before drainage (lower arrow).

acute aspect and, in fact, became an empyema, so he returned to the hospital, where this was drained through a rib resection in the axillary line at about the level of the ninth rib, and I have permitted this opening to persist to prevent recurring empyema. Further rib resections were performed in the anterior axillary line in order to reduce to a greater degree the

size of the pleural space and in addition to this I performed phrenic nerve resection on the right side in the neck During the course of convalescence after the phrenicotomy several little pus tracts—the result of former punctures in inducing the pneumothorax—coalesced in the anterior axillary region and became practically a cold abscess of the soft parts of the chest wall I extirpated this suppurating area and it healed promptly

Just at this point it may be well to say a few words about the occurrence of chest wound infections as a result of puncture The wonder is that they are not encountered more frequently When the needle is withdrawn from an infected cavity whether tuberculous or not the implantation of organisms into the chest wall is ordinarily inevitable Whether the tissues will take care of these or not depends upon the resistance of the individual and the character or virulence of the bacteria I have seen a number of cases in which ill advised puncture into a gangrenous lung abscess has been followed by fatal gangrenous phlegmon of the chest wall, and when the needle is used to produce an artificial pneumothorax in tuberculosis the puncture being made through tuberculous pleura we have the added tendency produced by air pressure from within which forces the infection into the needle tract To avoid this there are two important precautions first, never purposely puncture the lung through the unopened chest whether there is an abscess or not second, inject a few drops of alcohol into the needle as it is withdrawn from the chest wall This not only empties the needle of infectious material but will act as an antiseptic sterilizing the puncture tract

This patient has improved to a great degree He is up and about, leading a life of almost normal activity There is no cough, no fever, no expectoration The thoracic fistula now almost entirely lined with skin is retained for the reasons given Once a day the patient inserts a catheter of small size and a few cubic centimeters of thin purulent material escape Between times there is no discharge and he does not wear a dressing I believe in this instance that no attempt should be made to close this opening until the cavity has become obliterated

As I stated before, in tuberculosis the idea of multiple rib resection is not only to reduce the size of the hemithorax and abolish the negative intrapleural pressure but also, and perhaps more important than this, to bring about fixation of the thorax. Formerly it was believed that the actual length of the costal sections was of importance in reducing the size of the chest. Now we know that this is of less consequence than the dropping of the ribs into a position of great obliquity so that they are almost parallel with the spine, which brings about a reduction in intrapleural volume The first rib must be resected if this is to be done, or it will hold the other ribs up and prevent their assuming the most advantageous position of obliquity. The resection of the first rib from behind is, however, the most difficult part of the operation. In close relation to this rib are the subclavian arteries, the brachial plexus, and other important structures, the wounding of which might be disastrous I have, therefore, devised an instrument which, so far as is humanly possible, does away with this danger and at the same time makes the section of first rib in local anesthesia much less terrifying to the patient than when shears or forceps are employed for the purpose

The instrument is made by Tiemann, and is in the form of a heavily built guillotine worked by a screw The beak is at right angles with the shaft, and when it is in place this beak is in contact with the bare rib It effectually shields all the soft parts from injury

Naturally, the prognosis for complete healing is much better when the complication of empyema is absent As a typical case I may mention that of a young woman who after several years of illness was referred to me by Dr. Brown, of Saranac There was fibrosis and cavitation of the left chest, with great retraction of the thoracic wall, and the most pronounced deviation of the mediastinum which I have ever observed In the radiographic picture the heart could not be seen. This was one of my early cases. I performed the operation in a single stage in general anesthesia. The shock was great and transfusion was necessary. Recovery, however, was

rapid and complete disappearance of all symptoms of tuberculosis followed About two years later I operated again upon this patient this time for an acute suppurative general peritonitis following the rupture of a diseased appendix This was followed by the surgical evacuation by rectum of a large pelvic abscess Recovery was uncomplicated, with no sign or symptom pointing to her former tuberculous condition and she has remained well ever since At present it is my custom to precede the operation by a phrenic nerve avulsion and I am convinced that this is followed by great amelioration of thoracic distress including cough Cases have been reported in which an apparent cure resulted from this procedure alone Still ordinarily one would continue after the phrenic paralysis with the thoracoplastic operation in two or more stages The danger of operating in one stage or of doing too much at one time is that the other lung seldom entirely free from disease may show renewed activity

There are a number of other operations for the treatment of tuberculosis besides that described here but there are no patients present to illustrate them and I shall therefore not enter into a discussion of their merits

---

The diseases of the other thoracic organs and of the mediastinum, including the esophagus cannot be taken up today but I will report upon a case illustrating the operation recently devised for the relief of the disorder known as angina pectoris Because the patient is not here I will show with the help of Mr Nourse and the daylight screen two photographs of her, and, by the way, you will see how sharply these pictures come out on the curtain, although the room is not in the least darkened The lamp in this apparatus is water cooled and I am not afraid to leave my most valuable slides exposed for any length of time The pictures are thrown from behind the screen another distinct advantage because the lamp and operator are out of the way

Up to the present time it has been impossible to afford lasting relief to the patients afflicted with this dread symptom complex As you know, medical treatment is but slightly palliative or is

totally inefficient, but now, thanks to the ingenuity and scientific acumen of Jonnesco, of Bucarest, surgery has come to its relief. As you will remember, a number of years ago Jonnesco applied the operation of cervical sympathectomy to other conditions, such as glaucoma and Graves' disease. Recognizing a probable conduction of painful impressions from the coronaries, and perhaps more certainly from the aorta by way of the chain of sympathetic ganglia in the neck and upper thorax, it occurred to him to interrupt this tract, and, accordingly, he performed his operation in this disease. Improvement and sometimes total disappearance of the painful seizures followed, and the operation rapidly sprang into favor, although it must be conceded that only the anginoid symptoms and not the underlying pathologic state can be affected by the procedure. Still the actual pain and shock of an attack of angina is frequently the direct cause of death, and then postmortem examination does not demonstrate an anatomic condition adequate to account for the fatality. Coffey and Brown in this country were pioneers in testing this method, and their results have been, on the whole, good enough to warrant trial at the bands of other surgeons. The question of how much of the sympathetic chain must be extirpated is still undecided, but it appears probable in spite of certain known physiologic facts that the crucial part is the extirpation of the superior ganglion Since Jonnesco began his work section of other nerves has been performed, with varying results, but I shall confine myself today to the recital of the history of this case in which typical cervical sympathectomy was performed. I have had 3 other cases, of the 4, one appears to be practically "cured," 2 other are greatly relieved, although it is too soon to give a final report. The fourth, I fear, will turn out to he a failure, for she has had one severe attack since the resection of both sympathetic chains.

Case VII. Angina Pectoris; Cervical Sympathectomy (Bilateral).—The patient whose picture is now on the screen is a woman of forty-nine, a patient of Dr Louis Miller, of New York. I first saw her in February, 1924. For six years she had had

characteristic attacks at least once a week and sometimes twice in a single night. Occasionally they lasted as long as two hours. It was a case accompanied by hypertension the systolic blood-pressure going higher than my instrument could register, that is, more than 300. The diagnosis was confirmed by Dr. B. S. Oppenheimer after electrocardiographic and other studies.

Fig. 119.—Case VII, following bilateral cervical sympathectomy for relief of angina pectoris. Horner's syndrome best marked on the right, where all three ganglia were removed.

I operated on February 25, 1924, choosing the left side for the first surgical attack because the symptoms were the usual ones of left-sided pain running down the arm. The pulse-rate was increased—about 100. These operations are best performed in general anesthesia, and fearing cerebral hemorrhage on account of her hypertension and the excitement connected with the operation, I segregated blood in her lower extremities by ligat-

ing the thighs close to the body so as to produce deep cyanosis of the thighs and legs. This reduced the blood-pressure to 240 systolic and 220 diastolic. I have frequently been able to reduce blood-pressure by this means to a much greater degree. The ligatures were left on during the operation At its conclusion systolic reading was 230

To reach the cervical sympathetic I make an incision along the posterior border of the sternocleidomastoid muscle, dividing

Fig 119 —Same case as Fig 118 Scar of the last operation

the clavicular part below if this is necessary. The external jugular is tied and divided, and with blunt retractors the muscle and the bundle containing the carotid artery, the jugular vein, and the vagus nerve is drawn forward This exposes the rectus capitis anticus major which lies upon the prevertebral fascia Just behind the jugular vein near the skull lying upon the fascial layer of this muscle, and sometimes difficult to distinguish from the fascia itself, lies the superior cervical ganglion of the sympathetic nerve When once seen and gently lifted forward

the characteristic spider-like form of the ganglion makes it comparatively easy to identify. At any rate it cannot be mistaken for anything else in this region. The nerve prolongations from the ganglion are cut away with scissors and the ganglion itself, usually nearly an inch in length, is grasped with forceps and avulsed from its cranial attachments. Using this ganglion as a handle the main sympathetic nerve itself is easily followed down to the middle ganglion, which is small and sometimes inconspicuous. The attachments of this ganglion are also cut away and the nerve followed down still farther. At the root of the neck care must be taken not to injure the vertebral artery, in front of which lies the lowermost cervical ganglion, a body of considerable size, but rarely as large as the superior ganglion. This, too, is avulsed and the wound closed by suturing the skin or, as I prefer it, by using metal clips. Immediately the pupil of the same side becomes contracted, and as soon as the patient is conscious and opens his eyes the syndrome known as Horner's is observed; that is, there is a sinking of the globe and a drooping of the upper lid. The pupillary appearances should be noted while the patient is on the table, and in order to make this observation certain it is best not to administer morphin or any miotic drug before the operation. A small calibered multifenestrated tube is placed in the wound so that it emerges at the lower angle to take care of the postoperative serous discharge. It is removed in forty-eight hours.

In the present instance only the upper and middle ganglia were removed. Primary union followed the operation. The blood-pressure dropped to 205 two days after operation, gradually rising to 251 in a week. The immediate result was most gratifying, the patient was able to sleep, and, as she expressed it, had her first restful night for more than six months. There were no further attacks of pain, although, as is usual in these cases, the patient did have sensations which would ordinarily have preceded an anginoid seizure, but which took the form of what is known as *angina sine dolore*. About October 1st, approximately seven months after the operation, she had a very severe headache accompanied by anginoid symptoms.

The attack was so intense that Dr. Miller performed phlebotomy and also employed leeches on the right side of her head. About the middle of October I saw her again. At my suggestion she readily submitted to resection of the right cervical sympathetic chain, which was done on October 24th, employing the same technic as that already described. There was prompt healing and the blood-pressure dropped to 180 over 120. The pictures which I show here give a fair idea of the patient's appearance at present. Whether she has seen the last of her anginoid attacks or not I cannot say, but she is totally free from anginoid pain, is hopeful, and does not regret the operations

From the experience of Jonnesco and other surgeons we know that even with both sympathetics extirpated there have been instances of recurrence When I was recently asked at a medical gathering what my opinion of the operative therapy might be, I replied by stating that if I were unfortunate enough to be attacked by the disease I would unhesitatingly submit to the operation.

POST-GRADUATE HOSPITAL

CLINIC OF DR. H DAWSON FURNISS

URINARY INCONTINENCE IN WOMEN

THE subject of my talk this morning will be the diagnosis and treatment of urinary leakage due to the different forms of fistulæ, sphincter relaxation, and aberrant ureters The incontinence due to distinct nerve lesions is purposely omitted

Of the fistulæ, we have ureteral, vesical, urethral, and renal, alone or combined, and fistulæ from the pelvis of the kidney

The ureteral fistulæ may be to the skin, the bowel (rarely), the uterus, and most frequently to the vagina. Such fistulæ may be complete or partial, in that only a portion of the urine escapes through the adventitious opening. Urine may be discharged from the ureter at the point of injury, or, as is more common, through a sinus from the injured point to the outside world. Usually changes occur in the ureter itself, its sheath, or the kidney, that complicate what at first was a relatively simple condition. Such changes are:

(*a*) Ureter stenosis, with subsequent dilatation of the ureter, causing hydro-ureter and hydronephrosis; this, in turn, producing atrophy of the renal tissue. Incident infection, a frequent occurrence, hastens and intensifies the destructive process.

(*b*) Infection sometimes occurs at the point of injury and occasionally extends along the periureteral sheath to the kidney, producing a perinephritic abscess. There may form an abscess near the divided end of the ureter. These conditions have been well illustrated by John A. Sampson, some of whose pictures I shall show you.

The above-mentioned points on the location, character, and results are given because in our diagnosis of fistulæ we have

to determine not only that there is a ureteral injury but also its location, the extent of renal damage, the presence or absence of infection, if complete or incomplete, etc , to plan appropriate treatment.

Ureteral fistulæ usually occur after operations that are technically difficult because of obscured landmarks, or that are so extensive that the vitality of the ureter is endangered by too free dissection from the vascular supply Operations upon the ureter are sometimes followed by fistulæ, and in such cases there is nearly always obstruction (stone or stricture) below the operative area These fistulæ usually close after dilation of the ureter or removal of the stone It is occasionally noticed after labor, and sometimes as a result of extension from carcinoma of the cervix

The usual history is that a few days after an operation there appears urinary leakage. If there is a division of the ureter and simple catgut ligation, the leakage may appear in two or three days. When due to clamping, or to too extensive dissection with consequent necrosis, the leakage does not begin for about ten to twelve days This leakage is practically always to the skin or vagina, very rarely to the bowel or through the uterus

If the injury produces a complete fistula the patient will lose approximately as much urine through the new channel as she passes normally from the bladder, until such time as renal damage lessens the kidney output on the injured side. Where there is a side wall injury of the ureter that permits a portion of the urine to pass into the bladder normally the amount passing through the fistulous tract varies, and often there is none for a brief period.

If the history suggests the possibility of a ureteral fistula we proceed as follows: 10 c c. of 3/10 per cent. indigocarmin is injected intravenously, and the time and intensity of the elimination from the ureter observed through a simple examining cystoscope. With a history of operation followed by incontinence the failure to see with the cystoscope elimination of the dye from one ureter, with elimination from its fellow,

is strong presumptive evidence of a ureteral fistula. At the same time the bladder is carefully searched for a possible vesical fistula.

A lessened amount of excretion on one side, with incontinence, suggests the probability of a side-wall injury to the ureter The extravesical amount eliminated varies, and in favorable cases a gradual decrease in the amount indicates the probability of spontaneous healing.

A catheter is then passed into the ureter on the suspected side, and if there is a complete severance of the ureter it is generally obstructed at the connection of the ureter with the sinus, or if the injury is low and a complete hysterectomy has been performed, the catheter may pass into the vagina. It is seldom possible to pass the catheter through the sinus into the upper segment of the ureter. If the injury to the ureter is not a complete severance, but only an impairment of one side, the catheter may or may not pass above the injured point into the upper ureter.

Should the fistula be to the vagina, the patient is then placed in the Sims or the knee-chest posture, preferably the latter, the posterior wall instrumentally retracted, and a search made for the opening. It is necessary to have good illumination (the Klar headlight is the best I know). In fresh cases, before renal damage has lessened the urinary secretion and the ability of the kidney to eliminate dye, the sinus is easily located. If there is difficulty in locating it, the vagina is packed with cotton tampons, and the patient allowed up for a few minutes. The tampons are carefully removed and the stained portion helps to locate the sinus. Where there is an alkaline pussy urine phenolsulphonephthalein is better than indigocarmin, as under such circumstances the indigocarmin is eliminated as a colorless substance. *If phthalein is used when the urine is acid the color* is better shown if the tampons have been soaked in a mild alkaline solution.

On locating the sinus, an attempt is made to pass a ureteral catheter to obtain a specimen for examination, and to ascertain the degree of ureteral and renal dilation, function of the kidney,

and to determine if there is infection If this is not practical, such specimen is obtained by having the patient sit on a vessel until sufficient is excreted The condition of the cervix and vagina should be noted so as to calculate the probable amount of pus from these sources, and a vaginal examination done to determine the degree of induration around the sinus The possibility of perinephritic inflammation and abscess must be considered and steps taken to determine this

It must be remembered that in many of the ureteral injuries the upper segment retracts to a point that is well above that at which a catheter passed into the lower segment is obstructed.

An unusual type of fistula is that following a nephro-ureterectomy, in which urine escapes from the bladder through the stump of the ureter, and thence by a sinus tract to the abdomen or vagina. I have seen this once after a nephro-ureterectomy for renal and ureteral tuberculosis

Occasionally a fistula persists after operation on the kidney or its pelvis The continuation of such drainage indicates tuberculosis or ureteral blocking, and, if due to the latter, ceases rather promptly after relief of the obstruction.

Total and differential renal function is next determined by phenolsulphonephthalein, collecting the urine excreted into the bladder and that through the fistula This is checked up by a blood chemical examination.

Given a ureteral fistula, the next problem is a determination as to what should be done

If the patient's condition is bad, and the expectancy of life short, nothing other than measures to make the leakage more bearable should be considered

Incomplete fistulæ due to side-wall injuries often heal spontaneously, especially if the sinus tract is long. Should such not occur, a catheter inserted in the ureter above the injury usually accomplishes the desired result; if not, it is to be treated as a complete fistula

With a patient in good condition, and the kidney free of infection and functioning properly, we may follow one of several procedures: (*a*) as waiting for the kidney to become functionally

useless as sometimes occurs in the uretero abdominal fistulæ with long sinus tracts (*b*) ligation of the ureter, (*c*) ureterovesical anastomosis and (*d*) nephrectomy The two last are really the only ones that require serious consideration

In general it may be said that nephrectomy is the safer, easier and more satisfactory procedure for ureterovesical anastomosis is technically more difficult often a failure, and at times followed by a fatality Many of the immediately successful anastomoses are later followed by ureter stricture, with subsequent ureter and pelvic dilation renal atrophy and infection

Naturally we wish to save every kidney possible Cases suitable for ureterovesical anastomosis are those in which there is good renal function on the involved side, little if any, dilation of the pelvis and ureter, and no or only slight infection, where the injury is low and the pelvis is free of exudate In obese patients the operation is technically much more difficult In the postoperative fistulæ the anastomosis should be done as soon as the inflammatory exudate that always surrounds such a sinus has reached a minimum, and before the kidney begins to suffer from the result of ureter stenosis and infection

Nephrectomy is the better procedure if there is marked renal damage infection, and hydro ureter or hydronephrosis Also where the upper segment of the ureter is far distant from the bladder and if there is marked exudate in the pelvis

No attempt should be made to do the operation by vagina, as this would not constitute a real ureterovesical anastomosis, but an anastomosis of the sinus tract to the bladder Even though such a procedure should be successful in stopping leakage the kidney always becomes infected and the necessity for a nephrectomy is only a matter of time

There is another condition in many of its symptoms similar to ureteral fistulæ, namely, an extravesical opening of a ureter The history of this is leakage since birth, no history of injury, plus normal voiding I have had 2 of the 30 reported cases, and know of 3 others that have not appeared in the literature, which makes me believe the condition more common than is generally thought

The abnormally opening ureter may be a supernumerary or a single ureter, generally the former, and in the female the opening may be in the urethra, the vestibule of the vagina, or the anterior wall of the vagina. Where there are two ureters on one side, the one from the upper pole of the kidney opens most distally If the opening is not readily found, in favorable cases it may be detected by giving phenolsulpbonephthalein or indigocarmin intravenously after packing the vagina and vestibule with cotton and locating the opening by the stain. The abnormal ureter is often stenosed and there is consequent hydronephrosis with renal atrophy, making the detection of the condition difficult, for the kidney may not excrete sufficient indigocarmin or phenolsulphonephthalein to help.

When this condition is strongly suspected, and a history of constant leakage since birth helps to confirm it, when the orifice of the ureter cannot be located, then indirect evidence may be obtained by making a pyelogram by injection through the ureters that open in the bladder Absence of the upper calix in one of the kidneys would be fair presumptive evidence that the upper pole of the kidney is drained by an aberrant ureter.

In cases that have been reported the following operations have been done:

1 Ligation of ureter.

2. Anastomosis of the dilated end of the ureter and bladder, done either through the vagina, or from the bladder after a suprapubic cystotomy. Hunner in one instance through a Kelly endoscope made an opening from the bladder into the dilated ureter with a cautery.

3 Implantation of the ureter into the bladder either by a vaginal plastic or abdominal operation—both intraperitoneally and extraperitoneally

4 Resection of the upper pole of the kidney.

There have been successes and failures in all these operations except the resections Even in the ureterovesical anastomoses, in those reported as successes, a number have had subsequent histories of pyelitis, stricture of the ureter, or cessation of function of that portion of the kidney drained by the extra-

vesical ureter. This is not surprising when it is remembered that in a number of these the ureter has been dilated and there has been present infection. Even under most favorable circumstances the ultimate results in ureterovesical anastomosis have not always been satisfactory on account of subsequent stricturing of the implanted ureter, with dilation and infection.

In formulating plans for treatment each case has to be individualized and treated accordingly. However, I think the cases may be divided into the following groups:

1. Cases suitable for ureterovesical anastomosis. Those showing a goodly amount of renal tissue drained by the accessory ureter; no infection, good function and absence of hydro-ureter and hydronephrosis. The choice of the vaginal or abdominal route, for this implantation, is dependent on the condition of the lower end of the ureter. Should it be easy to dissect it out and should it not be dilated, implantation per vaginam is a safer and simpler procedure than by the abdomen. Should this be a failure, the result is not serious, and an abdominal implantation can be done at a later date. I believe that the extraperitoneal operation for this implantation is the better and safer procedure.

2. Cases suitable for simple ligation. Those showing only a small amount of renal tissue drained by the accessory ureter; no dilatation of the ureter and no infection.

3. Cases suitable for resection. Those showing a small amount of renal tissue, or dilated ureter and pelvis, or infection—one or all of which are indications for resection.

As the majority of cases fall in this category, I feel that resection is the best procedure. Its advantages are that it is less difficult, less dangerous, more certain in results, and not so apt to be followed by delayed complications As the renal vessels are terminal, there is very little difficulty in controlling bleeding. Young, Eli, Legueu, Josephson, and I have been well satisfied with this procedure and consider it the method of choice.

The vesical fistulæ usually follow difficult labor, with or without instruments, operations, extension of disease (as carcinoma), or radium treatment. Such fistulæ are nearly always

to the vagina, though some operative ones, as a persistent sinus after a suprapubic cystotomy or the perforation of an intestine (from tuberculosis or carcinoma), do occasionally occur. The leakage may follow immediately after the injury, or within a few days when due to sloughing of the traumatized tissue. I had an interesting and unusual case who had had made a vesicovaginal fistula for severe cystitis It drained only three days. Four years later, after successful treatment for the cystitis, she began to lose urine through the vagina The small opening had been water-tight so long as there was edema of the mucosa and became patent when the inflammation was relieved

Frequently the vesicovaginal fistula is complicated by urethral sphincter relaxation or urethral fistula. The amount of leakage is dependent upon the size and location of the fistula, and the tonicity of the vagina.

Usually the fistulæ are easily seen through a cystoscope or by inspection of the vagina If the opening is so large that water distention is impractical the Kelly method of cystoscopy is used. In the difficult cases, where the opening cannot be found in this way, I have proceeded as follows. a catheter is placed in the bladder, the patient put in the elevated lithotomy position, the posterior wall well retracted, the vagina illuminated by a brilliant headlight, and colored fluid injected into the bladder through the catheter. A search is then made to locate the opening through which the fluid escapes Often this is so rapid that the field is immediately obscured I have found almost indispensable a vacuum aspirator, placed in the vagina to remove the fluid as it accumulates When made as part of the retractor such an aspirator is excellent, as it is out of the way and obviates the necessity of having someone to handle it As soon as the leaking point is located a small probe is passed through it Such an opening may be anywhere in the anterior wall of the vagina or the urethra. Occasionally the fistulous tract is through the cervix or uterus The colored fluid is then removed from the bladder, the posterior wall retractor removed, and the bladder cystoscoped through a clear medium. The probe is easily seen and the relation of the fistula to the ureters

and urethra determined. The sphincter of the bladder is tested as noted further on in urethral relaxation.

It is astonishing how well a fair-sized opening may be hidden away in a fold or depression. It is not always easy to find even after having been previously located. Only recently, with a patient under an anesthetic, I was twenty minutes finding a fistula, the location of which I had previously determined. I have one failure to my credit (or discredit) before I began using

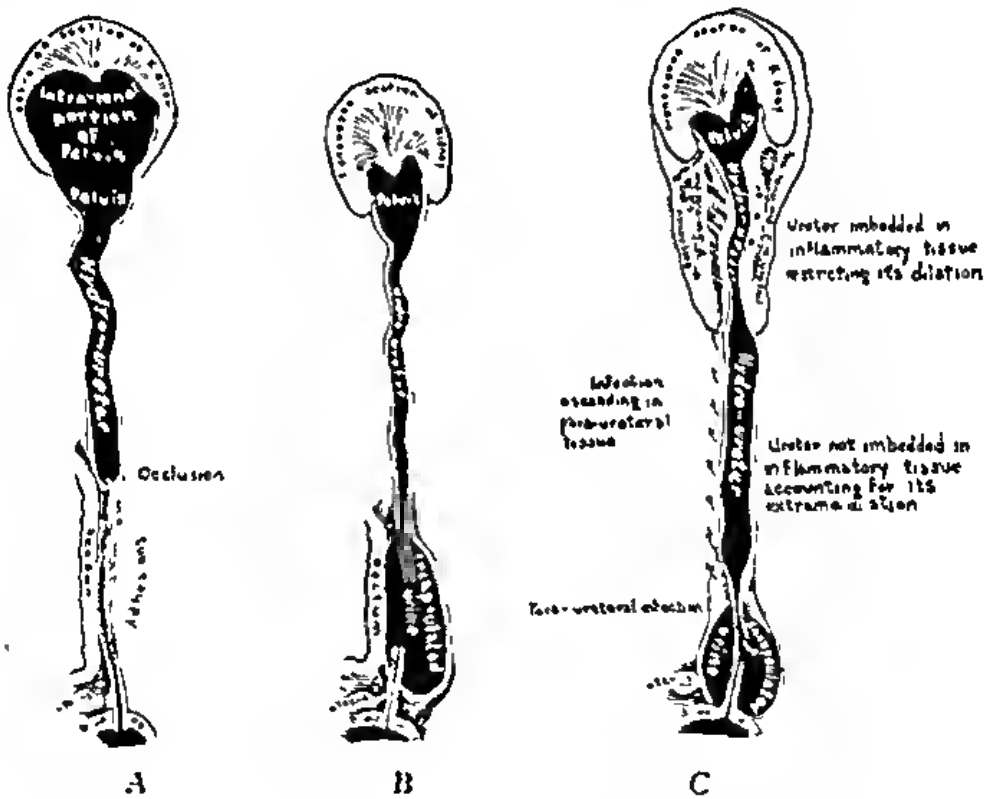

Fig. 120.—(After John A Sampson)

the vacuum aspirator. In this instance the fluid escaped into the vagina faster than I could sponge it away. With the aid of the vacuum aspirator I believe I could have kept the field sufficiently cleared to locate the leaking point.

To take up the operative treatment of vesical fistulæ would consume an unwarranted amount of time. A few general principles, however, may be enumerated: Good exposure of the field; if the vagina is too small the necessary enlargement may be secured through a pararectal incision on one or both sides.

The tissues should be so mobilized that the fistula edges may be approximated without tension. The vagina should be separated from the bladder and each closed separately It must be remembered that often a transvesical closure through a suprapubic opening is the easier, simpler, and surer procedure.

After operation the urine should be kept as sterile as possible (urinary antiseptics) and bladder distention prevented Frequent catheterizations, every three to four hours, have given me better results than continuous drainage by an indwelling catheter

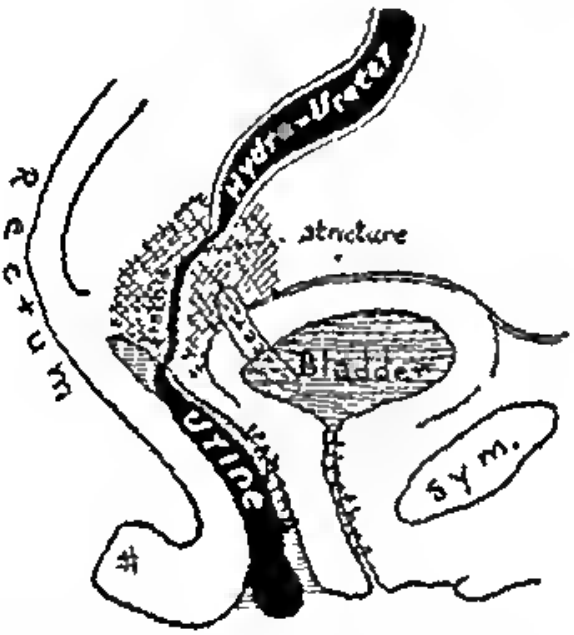

Fig 121 —Complete severance of the ureter The cross-hatching represents the inflammatory exudate always present, the narrow black, the sinus connecting the ureter and vagina. Ureter dilatation is usually present above the narrow sinus Note the separation between the divided ends of the ureter (After John A. Sampson)

Such a catheter is difficult to keep clean, and should it become partially or completely plugged the bladder may become too much distended and the opening break through.

The most frequent cause of incontinence which I have encountered is that due to relaxation of the vesical sphincter This most often follows labor, though a few cases have been noted in nulliparæ. The incontinence varies from slight loss on straining (as overlifting, coughing, sneezing, laughing) to total loss, even in the recumbent position With many pa-

tients it is difficult to determine from their account—"that they cannot hold urine"—whether they mean very frequent

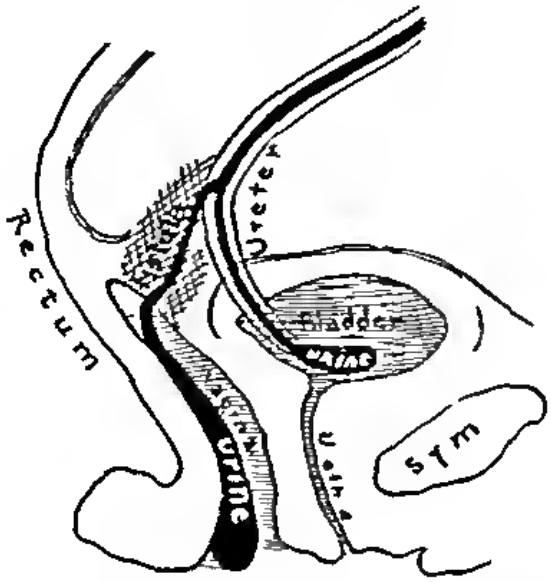

Fig 122.—A sinus following a side wall injury of the ureter. Such sinuses usually close spontaneously unless there is ureter obstruction below. (After John A. Sampson.)

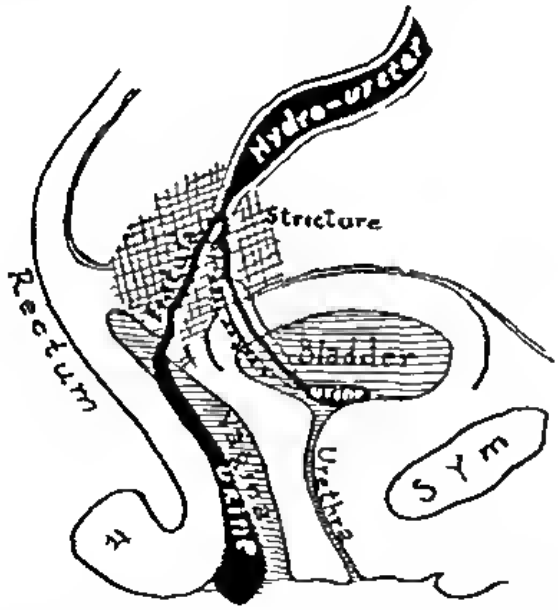

Fig. 123.—This represents a fistula from the ureter to the vagina, and from the ureter to the ureter. Such a condition is at times difficult to differentiate from a side wall injury of the ureter with a fistula to the vagina.

urination or incontinence. If the clothes are never wet, it is probably frequent urination.

The diagnosis is made from the history and local examination. One is impressed with the lack of resistance to the passage of instruments through the urethra. With filled bladder the patient is made to strain, while the examiner watches the meatus

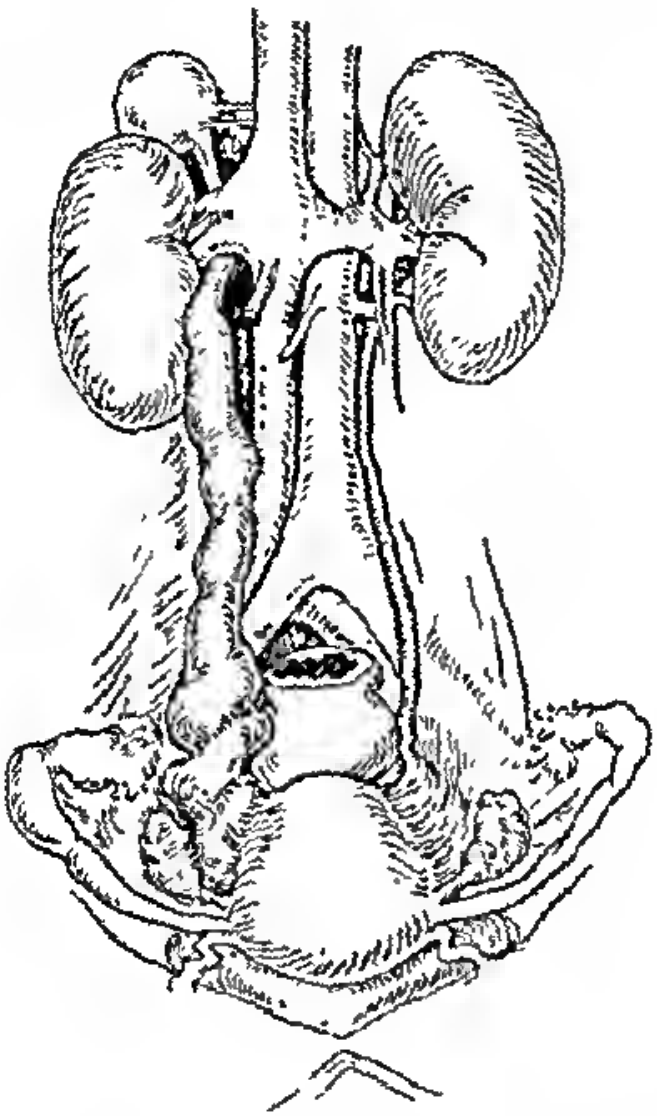

Fig 124.—The enlarged supernumerary ureter is shown draining the small upper portion of the kidney. This portion of the kidney has its own blood-supply and was separated from the larger portion without bleeding. The supernumerary ureter was greatly dilated. The two ureters were closely attached, but were easily dissected free.

to determine the amount expelled. To gain a visual picture of the urethral sphincter an examination is made with an instrument of the endoscope type, either with water dilatation (Gerringer, Farrar, or Fulkerson) or with air-distention, with the patient

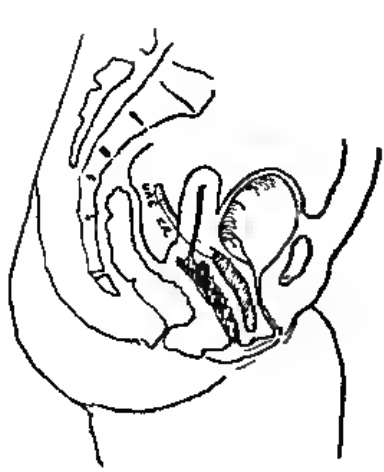

Fig 125

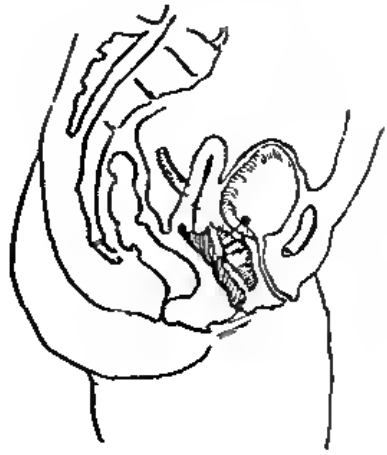

Fig 126

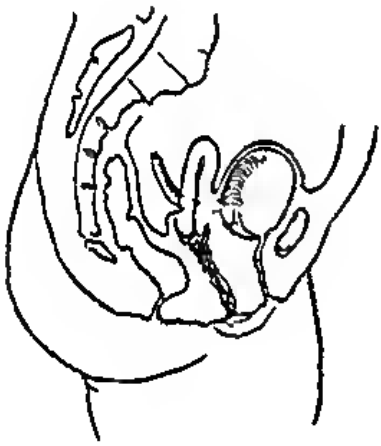

Fig 127

Fig 128

Fig 125 —The dilated distal end of the supernumerary ureter shown as a fusiform sac with a minute orifice below the urethra

Fig 126 —The result of the first operation—an opening between the dilated lower end of the supernumerary ureter and the bladder and an opening between the ureter and the vagina, the result of failure of union of the vaginal wound

Fig 127 —The end result—the supernumerary ureter implanted in the bladder

Fig 128 —The opening of the supernumerary ureter is shown below the ureter In life this was not so large or so distinct The line shows the incision made through the perineum to gain access to the base of the bladder

in the knee chest posture (Kelly, Farrar, Fulkerson, or Young's 'scope) It will be noted that on withdrawing the 'scope from the bladder into the urethra the sphincter does not close over

the end with the normal tonicity, and may remain open until the instrument is well past it. This is especially marked with the water endoscopes

Kelly's operation has given me approximately 80 per cent. cures in the 24 patients I have operated upon. This included all degrees of incontinence. It is an almost sure cure for those of mild and moderate degrees In a few I have tightened the sphincter through a suprapubic incision. This is not quite as satisfactory as the classical Kelly, and should be reserved for cases that are technically difficult for the Kelly, *i. e.*, very small vaginas, senile atrophy, and excessive scar tissue around the base of the bladder

There are cases of trigonitis and urethritis that are associated with moderate incontinence These are often relieved by silver nitrate applications So if there is any doubt as to whether it is a case of relaxed sphincter, it had best be given a therapeutic test (applications of silver nitrate) before going to operation

Urethral fistula alone is rather uncommon and gives little trouble The patient may notice a division of the urinary stream on voiding. These fistulæ follow suburethral abscesses that open spontaneously or are incised, operation, or difficult labor. I have seen very few of them Two were associated with a relaxed urethral sphincter, and both followed very difficult forceps deliveries Such an opening may be found by vaginal inspection, urethroscopy, or by having the patient void while obstructing the external urethral meatus.

ST LUKE'S HOSPITAL

Clinic of Dr Francis Carter Wood

A SURVEY OF ROENTGEN THERAPY

The chief interest in the radiotherapy of lesions of a surgical type has in this country at least been confined to the gynecologists The general surgeon has not paid much attention to the subject and it has been left for its development largely in the hands of those who are engaged in radiography This I think, is unfortunate because, without making any individual criticisms the radiographers have, on the whole, not had the broad surgical and medical training which should be the equipment of those using radiotherapeutic methods Radiotherapy should be considered as a therapeutic adjunct to surgery and medicine, and it is to be hoped that the younger physicians and surgeons will take it up as such, not by any means as a specialty to which they may devote their entire time, but as a therapeutic method with the limitations and capacities of which they should be perfectly familiar

My own attitude on the moot question of the treatment of neoplasms has been for years that all operable malignant tumors should be treated by the surgeon for the reason that up to the present time no body of evidence has been brought forward to show that radiation in operable cancer is more effective or even as effective as good surgery Hence a definite rule is in force in this clinic that no patients with operable malignant tumors are to be rayed The one exception is made for the basal cell tumors of the face and in many instances, where the growth is in a site where it can be easily removed without serious scarring surgery is recommended to the patient in

preference to radiation. After considerable experience in the matter I see no reason to change my opinion on this attitude, as expressed ten or more years ago

On the other hand, I am strongly opposed to meddlesome surgery in inoperable cases, believing that it is as bad as meddlesome radiation on operable patients, and hope to see in the very near future close co-operation between the specialists in both departments, so as to achieve a generally valid understanding as to the treatment of borderline types Without such under-

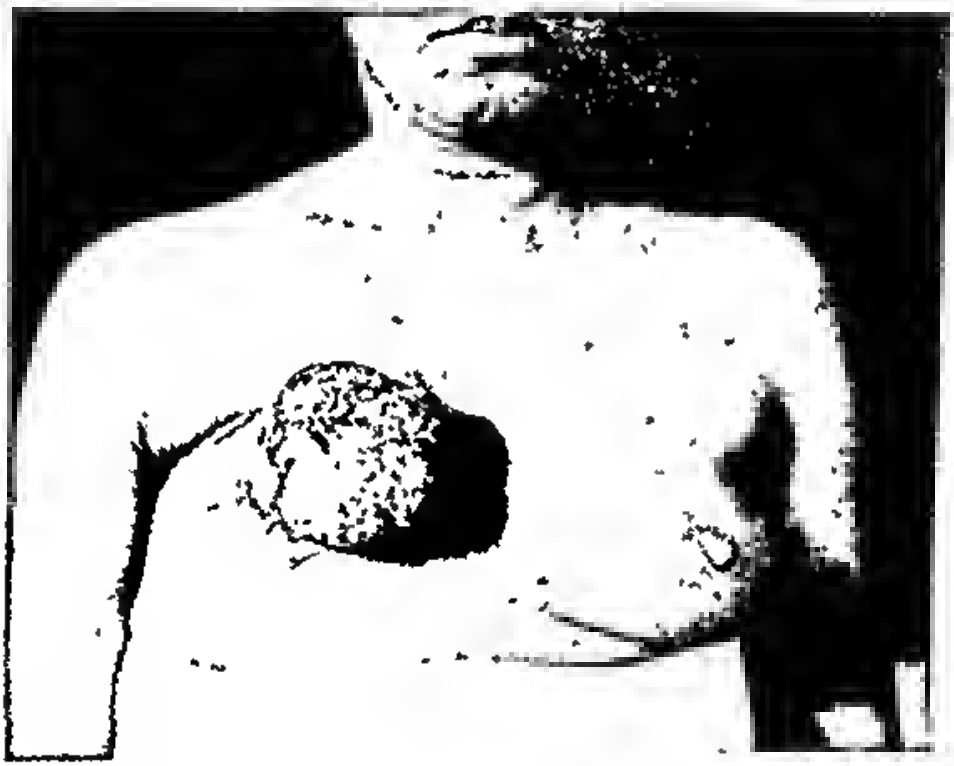

Fig 129.—Large fungating carcinoma given two treatments with x-ray.

standing decisions cannot be reached as to the applicability of radiation or surgery, or both, in these most difficult cases

Obviously we ray in addition to inoperable carcinomata a large number of medical conditions, and benign tumors, among which may be included fibromyomata of the uterus In a large series of the latter type we have had most admirable results. Sarcoma of the uterus certainly does not occur in more than one case in 500 myomata, and the only contraindication for radiation of these growths is extreme size, sloughing of the

myoma itself, calcification, or acute infectious processes in the adnexæ. These patients should be operated upon. I do not agree with the German writers, who feel that the uterine sarcomata can also he treated by radiation, though it is well known that these tumors are of very low malignancy. No one will dispute the fact that leukemia, Hodgkin's disease, and certain early types of exophthalmic goiter and a large series of minor ailments are properly treated by radiotherapy. We ray a good many cases of tuherculous cervical adenitis with good results,

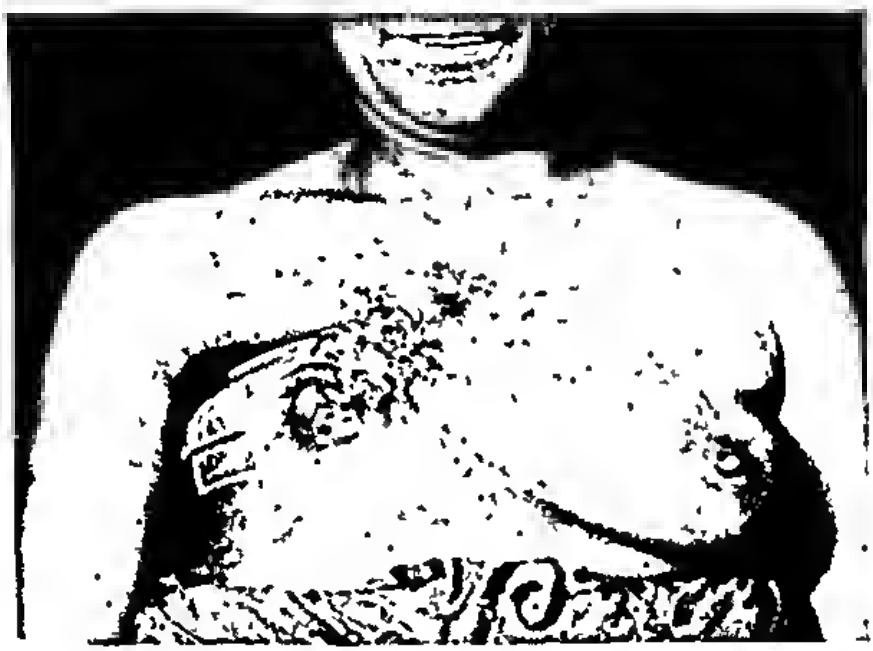

Fig. 130.—Same patient as Fig. 129, two years later, having refused further treatment, showing extreme radiosensitiveness

though I have gained the impression that surgical opinion is against that form of therapy. There is scarcely enough material to warrant any final statement in the matter, hut the question should he carefully studied, and it is prohahle that the addition of light therapy of the Finsen type may greatly improve our results.

The plant, as you see, consists of four tubes, two running at a maximum of 170,000 volts, and two at 200,000. Any voltage higher than 200 K. V. is impractical hecause of the rapid destruction of the tubes, which makes it impossible to treat

patients without so large an overhead that they cannot afford to pay for the treatments. One of the conditions under which this clinic was established was that it should pay its way. This it has done from its inception three years ago. We have a large material, about 1000 new patients a year, and we give between eight and nine thousand treatments. The tubes in the high-voltage apparatus are mounted in lead-lined tanks filled with transformer oil The tubes have to be shellacked before they are put into the oil, and when immersed are held in a simple

Fig 131.—Basal-cell epithelioma treated by caustics and pastes for a period of years, then with burnt alum, finally with radiation, proving resistant to this form of treatment, the growth was successfully excised

wooden frame which can be built by a carpenter A 0.5 mm. copper filter is soldered to the bottom of the tank, so that there is never any question of leaving the filters out As the tube is immovable, the dosage is determined by merely measuring from the anticathode to the patient's skin With that measurement the time for a suberythema dose is read off from a chart for voltages of 180, 190, and 200 K V. with 0.5 mm of copper and 1 mm. of aluminum The system has proved very satisfactory. The tubes have run in these tanks without cleaning or replacement for a year and a half, and have given a life of considerably

over one thousand hours at 200,000 volts They will now bave to be replaced by others because of the rougbening of the anti-cathode, which reduces the output, but they have not punctured.

It was found that the 4 inches of oil between the bulb and the filter absorbed so much *x*-ray that an inverted thin glass beaker had to be inserted so as to get an air column between the tube and the filter This permits the transmission of a

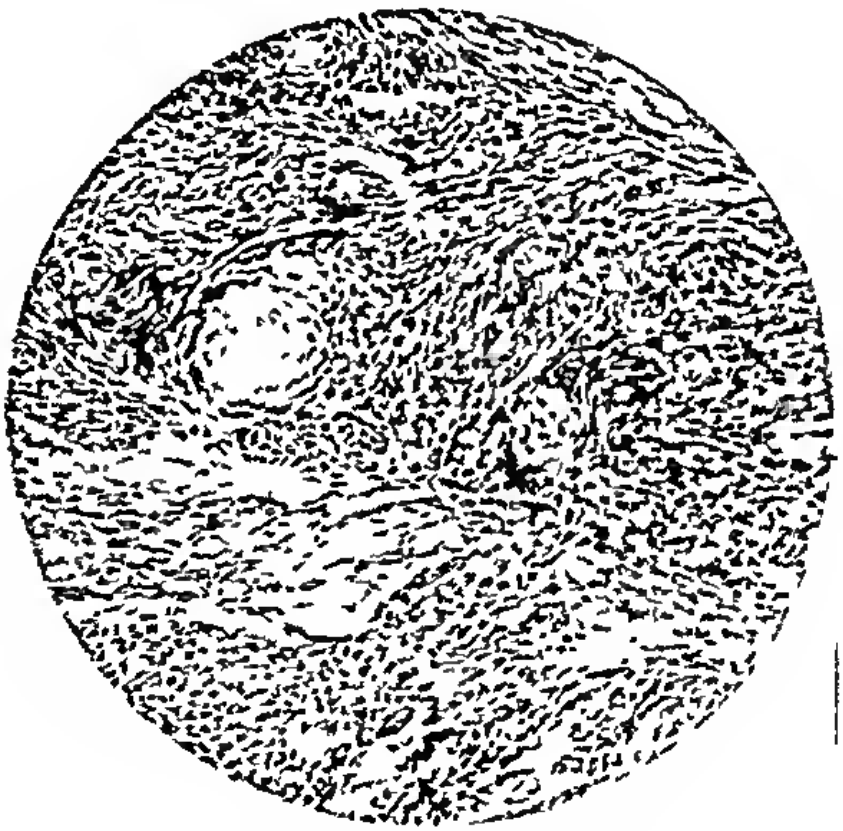

Fig 132—Section of tumor (Fig 131) showing keratinized areas which accounts for the resistance to radiation Such tumors require much larger doses than the pure basal-cell type

large beam, some 6 inches in diameter, and the dose proved to be larger than the tube yields in an open holder because of the large amount of short wave scattering from the oil, which is added to the beam directly from the anticathode The other two tubes are in the regular lead glass bowls, and are run at from 150 to 170 K V, depending on the nature of the lesion treated, using filters of zinc, copper, or aluminum, as may be required.

Since, as I have recently shown, equal ionization doses of x-rays are equally effective in killing tumors, there is absolutely no reason for using high voltages in the treatment of superficial neoplasms The difference between the average wave lengths, as determined by the Duane method, between machines running at 170 and 200 volts is only 0.03 of an Angström unit. Certainly this can give no appreciable difference in the effect, with far greater expense from wear and tear on the tube, and also,

Fig 133 —Basal-cell epithelioma of back susceptible to radiation

what is more important, far greater scatter from the beam after it enters the patient It is perfectly easy to see the bones of one's hand by the fluoroscope at a distance of 5 or 6 feet from a patient submitted to a narrow beam of high-voltage x-rays. This must inevitably damage the blood-making organs.

By giving each one of our patients an appointment it is possible to use all four tubes simultaneously, and we treat from 50 to 60 patients a day without difficulty. The lack of adjustability of the oil tanks has not proved to be of any importance.

One of the tables, as you see, is some 6 inches higher than the other This gives a focal skin distance of 40 to 50 cm , the other 60 to 70 cm , depending upon the thickness of the patient

So much for equipment. What are our results? Speaking only of cancer, our attitude has been that in all probability it is not possible to obtain a permanent cure of most cases of inoperable cancer by radiation, therefore the use of the heavy French and German doses, where severe burns are produced on the skin, in order to get sufficient radiation into the interior

Fig 134 —Same patient as Fig 133 after two doses of *x*-ray, showing extreme susceptibility to radiation

of the body, is unjustified If it were possible to produce cures, then any annoyance or suffering which might be inflicted upon the patient would be perfectly justified With this principle in mind, we have arranged our doses so that they are slightly above or below an erythema, depending upon the exigencies of the situation, and I may say that in over 30,000 treatments we bave never had a burn. Some patients, to whom we wished to give maximum doses, and whose skins were evidently more susceptible than the average, have shown reddening with desquamation later, but no blistering erythema has been produced.

I may very frankly say that we have had very few clinical cures. There are a few patients, one a sarcoma of the intestine, one a recurrence in the abdomen from a seminoma of the testicle, one a melanosarcoma with skin metastases, who are still well and symptom free after five years. We have a number of cases of recurrent carcinoma of the cervix clinically well for between two and three years We have a number of patients

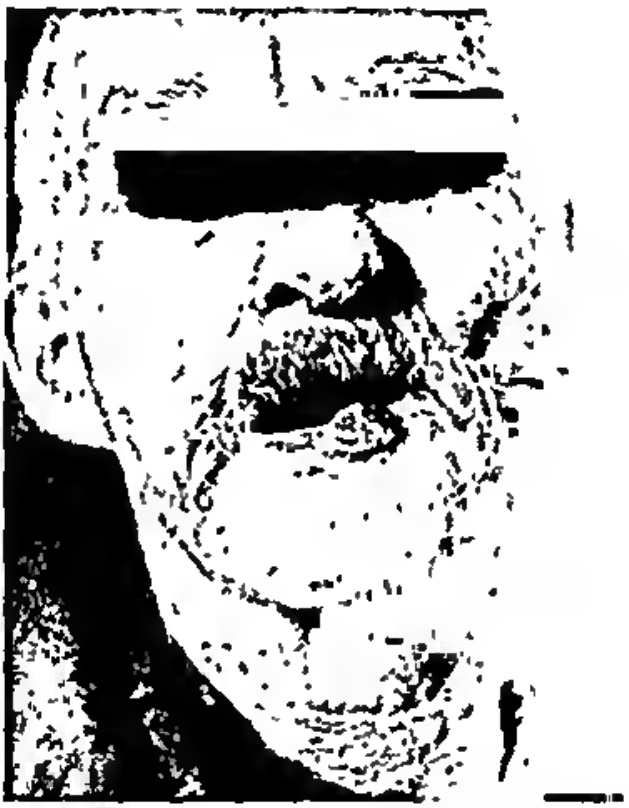

Fig 135.—Squamous-cell epithelioma of lip recurrent thirteen years after radium cure Morphology of present tumor exactly the same as that of a piece obtained by biopsy thirteen years previously. Nodes in the neck were never removed and are still uninvolved, showing low-grade malignancy of this particular tumor

with skin recurrences after mastectomy clinically well for three years Some patients with mediastinal recurrences following either mastectomy or removal of malignant growths of other sites have gone for a year, a year and a half, or two years, without serious symptoms, only to die rather suddenly at the end of that time. The distressing pleural exudates so frequent in these patients are often promptly checked. In one carcinoma

of the bladder, after two years' treatment, the tumor was so small that after cystoscopic examination the surgeon excised it. One case of carcinoma of the urethra, inoperable when first seen, has remained in good health for two years, the growth being still present, but not extending. About 5 carcinomata of the prostate lived for one to two years in comfort, only to die finally from extension of the disease. Others have had only temporary relief from bone pain and bladder symptoms. We have had very little satisfaction from radiation of neck recurrences or direct invasion from epithelioma of the larynx, tongue, or lip. These squamous-celled tumors may be checked in their growth for a short time, but the benefit, except the relief of pain, has been very slight. Several hypernephromata did well for from one to two years, only to die from extensive recurrences later A few cases of inoperable carcinoma of the rectum, especially after colostomy, have been relieved of pain, and the growth somewhat shrunken by considerable radiation, but there is no promise from our results of any permanent benefit. The primary tumors of the lung have not done well, as a rule They seem to be very resistant, and while some relief can be obtained, it is not nearly as great as that often seen in metastatic mediastinal masses, the treatment of which often gives astonishingly good symptomatic results The accumulation of fluid in the pleura may be checked, the patients gain weight, the cough disappears for a considerable time, and great clinical benefit is obtained We have preferred to give moderate doses, spaced a week or two weeks apart, judging of our capacity to treat largely by the clinical symptoms. The pouring into these people of very large doses of high-voltage *x*-ray only results in terrible depression, anemia, and even death. Nothing is gained by such a procedure. If the disease does not yield, it is better not to make a desperate attempt to achieve the impossible. All patients here are treated as ambulant cases, and many of them have been at work during the course of the treatment.

Recurrent nodes above the clavicle after a mastectomy have been healed for a time, but one difficulty is that if very large doses are given in this region, scar tissue may form around the

brachial plexus, and by its contraction cause severe neuralgic pains which are just about as bad as the pressure of the neoplasm, so that here too the results depend more upon the individual susceptibility of the tumor and the site of the recurrence than on any other factor, and any general statement is impossible A few perfectly hopeless inoperable antrum and facial tumors of the basal-cell type, which had been treated by quacks until they invaded the bones, have obtained remarkable relief

Fig 136—Inoperable and neglected carcinoma of the breast of long duration

for a time, but the end-result will probable be the usual. The lymphosarcomata, usually considered so very favorable, have not, in our hands, proved very satisfactory to treat. It is true that in general the tumors often shrink and may disappear, and the patients' mediastinal pressure be relieved, while in a number of instances total disappearance of all palpable nodes has been observed, but, despite this clinical improvement, the disease seems to progress elsewhere, probably by diffuse involvement of viscera, and in six months or a year the failure of the treatment is evident Carcinoma of the stomach we have in general refused to handle, because of the severe damage resulting

from exposure of the organs in the upper abdomen and the low grade of susceptibility of tumors of this type One case, however, microscopically verified, has been treated with moderate doses for six months, and has gained greatly in weight, and seems in perfect health. Carcinoma of the esophagus has been unsatisfactory No great benefit has been observed in any of the patients we have treated I have refused to treat inoperable epithelioma of the lip, tongue, tonsil, or larynx It is better

Fig 137 —Same patient as Fig 136 after two and a half years of x ray treatment Patient still able to work, but beginning dissemination en cuirasse Tumor no longer susceptible to radiation

to use radium needles in these situations, preferably in small doses, so as to palliate, rather than to attempt a cure The patients on whom large quantities of radium are used in these regions have suffered greatly from pain, and the tumor has recurred with its usual promptness, so that nothing was really gained in comfort or prolongation of life Recurrences from bone sarcomata have been considerably benefited, but, as a rule, the checking of the growth for a time is the only apparent result We have had a number of extremely satisfactory results following

the radiation of papillary ovarian carcinomata. Four cases show no evidence of any return of the growth, even though at the time of operation the peritoneum was seeded with transplants. As is well known, these tumors vary greatly in malignancy, and our good cases are probably those with low tumor vitality. Other patients have shown little or no benefit, and these belong to the highly malignant types

To sum up: The results show that on the whole we have accomplished a great deal The relief of pain, the checking of the growth of a tumor, temporary as it may be, has been of the greatest comfort to many patients, and radiation has brought relief which could be obtained by no other means. If out of the hundreds of inoperable cancer patients that we have treated, 4 or 5 are saved, it will be a salvation which no other method could offer, and as such should be continued as well worth the time and energy spent on the part of those who give the treatments

I am opposed to preoperative radiation. The benefits can be but slight, for it is impossible to kill all the cells of the tumor without giving four or five erythema doses to the skin. This means an immediate operation with removal of the whole radiated area The application of smaller doses for a period of three or four weeks is illogical, as only a few of the tumor cells can be killed by such treatment, whereas, if the dose is sufficient to do damage to the cells, it will also damage the skin, and the surgeon will get poor healing when he comes to his operation. The belief that the lymphatics are closed by such radiation is a fallacy, as I have shown experimentally.

Postoperative radiation I firmly believe in The statement has not infrequently been made by surgeons that their results are worse than they used to be before postoperative radiation was employed, but this is impossible, because the x-ray cannot make cancer grow where it has not previously been left, and if suitable doses are given, there is no reason to think that the growth is stimulated If such surgeons are having recurrences, it is because their surgery is not as complete as it should be. I very much doubt that postoperative radiation will prevent recurrences taking place in any but a small percentage of in-

stances, but, if we can add 10 per cent., for example, to the five-year cures of carcinoma of the breast it is well worth the time and trouble to the patient.

In benign tumors, such as uterine fibroids, as I have said, we have had splendid results by carefully adjusted treatments. Fairly small doses are given at intervals of ten days or two weeks for a period of two months. They are then interrupted to see if there is any return of the menstrual flow, in which case further radiation may be applied. I think it is bad practice to attempt to produce a complete menopause at one sitting. The nervous effects are as bad as those of operative removal of the ovaries In early exophthalmic goiter we have had some very good results and some failures. Hodgkin's disease and leukemia are held for the time being, the patient is much more comfortable with than without treatment, and life is prolonged in many instances.

This somewhat incomplete survey reports the results of three years' experience with surgical material in this clinic, and some six years previous work with *x*-ray on human beings. The palliative results have been so good that even despite many disappointments I have become an enthusiastic believer in the use of *x*-ray within the limits indicated, and think that its development, together with that of radium, has been the most important contribution to surgery since the days of Lister.

NEW YORK HOSPITAL (BRADY UROLOGICAL FOUNDATION)

Clinic of Dr Oswald Swinney Lowsley

Right Nephrectomy Under Paravertebral Anesthesia.
Enlargement of the Prostate (Two-stage Perineal Prostatectomy)
Right Nephrectomy with Paravertebral Anesthesia
Enlargement of the Prostate (Two-stage Perineal Prostatectomy)
Nepbropexy of Right Kidney

RIGHT NEPHRECTOMY UNDER PARAVERTEBRAL ANESTHESIA

The first case we have to present this afternoon is a woman, forty eight years of age, single She was first admitted to the hospital on February 18, 1924, and discharged March 9, 1924 On admission at that time she complained of frequent, urgent, painful urination She had had an operation for goiter seven years ago, which was her only previous illness Menopause at the age of thirty seven years

In November, 1923 the patient began to have frequent, painful urination which has become worse until the present time She now has nocturia ten to fifteen times, with marked burning over the bladder region and during and at the completion of urination

Physical Examination —Reflexes present throughout There is a mass the size of an egg at the lower border of the thyroid which does not pulsate and is not tender

Lung fields clear

Heart normal in position, no murmurs

Blood pressure 136/82

Abdomen somewhat tender over the bladder region Right

kidney is enlarged, palpable and movable, and slightly tender. Left kidney not felt

Cystoscopy at this time reveals a patchy cystitis and a large patch of beginning ulceration in the region of the right ureter The left ureter is normal. Vesical fundus shows some congestion Number 6 French catheter passed to left kidney pelvis without obstruction. Number 5 French catheter passed 5 cm up the right ureter, but further progress was obstructed. Clear urine flowed from the left side and blood-stained urine from the right side Specimens were injected into guinea-pigs and sent for chemical and microscopic examination; 1 c.c of phenolsulphonephthalein was injected intravenously and appeared in the right side in fifteen minutes and in the left side in five minutes. Total amount secreted in ten minutes after appearance time is trace. right, 10 per cent., left.

x-Rays were taken, and show an irregular, ragged, enlarged pelvis of the right kidney.

Suggestion. Suggestive of tuberculosis

The patient was cystoscoped February 23d. Her bladder condition had improved under bladder lavage with 1 · 5000 acriflavin. It was impossible to get a No. 5 catheter to the left kidney pelvis. It was then impossible to pass any catheter or bougie up the right side until April 30th, at which time both ureters were cathcterized with difficulty. Specimens from both sides were negative A guinea-pig report from each side was negative at this examination.

Various cultures showed Staphylococcus aureus and Bacillus coli communis A second guinea-pig was inoculated with urine from the right kidney, which was reported positive for tuberculosis.

Her blood urea nitrogen showed some retention varying from 22 08 to 27 6 mg. per 100 c.c. (normal 17 1)

Her phenolsulphonephthalein tests showed from 28 to 52 per cent output in two hours, with an intramuscular injection

The patient has lost considerable weight and complains of pain in her right kidney region, with continued dysuria and fre-

quent urination It is deemed advisable to remove her right kidney under paravertebral anesthesia

Urine analysis Specific gravity 1 016 acid reaction, marked amount of albumin, no sugar A great many pus-cells and a few red blood-cells are present No tubercle bacilli have been found in her urine at any time

The Wassermann is negative.

Operation.—The anesthesia, paravertebral, has been administered in the usual manner, and the patient has been placed on the table, as you see, with the right side on stretch I am making the usual kidney incision, carrying it down to muscle and fascia I have opened the perirenal fascia in its posterior

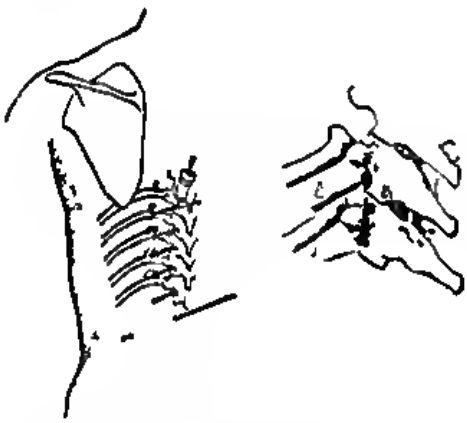

Fig 138 —Showing course of needle in relation to bony structures

Fig 139—Shaded area shows superficial and deep infiltration in tissues of loin Long line of infiltration parallel with spinal column

portion and am enlarging the opening forward In doing this I have made a small nick in the peritoneum, which I shall immediately close with catgut I am freeing the kidney from the surrounding fat without much difficulty I have separated the ureter, stripping it downward, and have now cut and tied it, cauterizing the ends with phenol

Separating the renal pedicle from the fat and putting a clamp in place, I will put in two double catgut sutures, the clamp being loosened while each is tied The kidney is ready to be cut away Following this, I have taken a transfixation suture just under the clamp, tying it on both sides Removing the clamp, I close the fascia with interrupted catgut, then close

the muscle with interrupted catgut, and then close the skin with interrupted silkworm-gut sutures. A cigarette drain has been placed to the renal pedicle The patient is in good condition and the anesthesia has been 100 per cent successful

Postoperative Report.—October 23d (the following morning): The patient complained of some pain about an hour after operation which required morphin Her blood-pressure showed no appreciable change There was no bleeding. The drain was

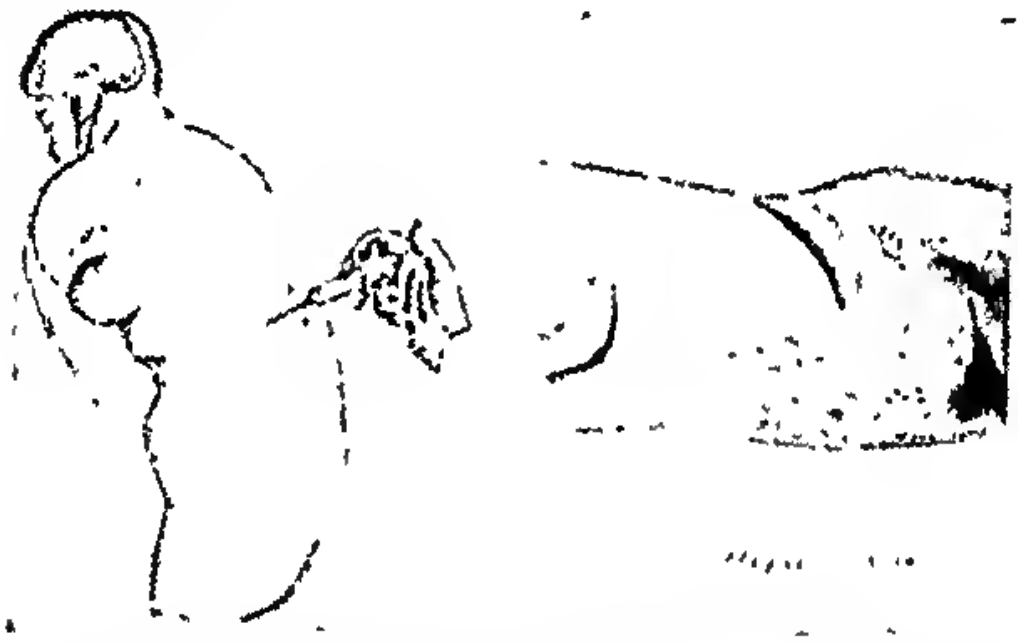

Fig 140.—Diagram at left shows position of patient receiving infiltration of foramina Diagram at right shows incision in loin for renal operation

removed this morning and the patient's general condition is good

Pathologist's Report.—The specimen was caseous, cavernous tuberculosis of right kidney, with chronic atrophic changes The specimen consists of the right kidney, fixed in formalin, measuring 10 x 6 x 5 cm. One-half of the organ is formed of large nodular elevations, each about 2½ cm in diameter and soft in consistence The surface is of pale whitish-gray color, and scattered over it are many brownish- or bluish-gray patches At several places we see small yellowish-white nodules about 1 to 2 cm in diameter slightly projecting over the surrounding

surface On section the parenchyma is of pinkish cloudy appearance normal markings cannot be recognized In the peripheral parts we see some yellowish spots each about 1 mm in diameter The parenchyma is partly replaced by many cavities filled with greenish yellow pus and lined by a rough pinkish wall The pelvis is dilated it is connected with some of the above mentioned cavities but some others are entirely closed

The wall of the ureter is 2 mm thick its mucosa is of brownish gray rough appearance Microscopic examination shows an increase of the interstitial connective tissue in all parts, the glomeruli are partly situated near the surface, and some of them are replaced by fibrous connective tissue showing hyaline changes These features suggest a chronic retrogressive process Large parts of the section are occupied by a granulation tissue including some tubules The dense round cell infiltrations are met with especially around the glomeruli and arteries At many places the granulation tissue shows the typical features of tuberculous granulation tissue and deep tubercles with advanced circular caseation are met with All parts of this granulation tissue contain many Langhan's giant cells Section of the ureter, 5 cm distal from the pelvis, shows the whole mucosa replaced by a granulation tissue which shows features of tuberculous granulation tissue, epithelioid cells and lymphocytes, but fails to show giant cells and caseation

ENLARGEMENT OF THE PROSTATE (TWO-STAGE PERINEAL PROSTATECTOMY)

The patient was admitted to the hospital on October 13, 1924, suffering from acute retention He has had frequency, nocturia, and dysuria He has never had any illness in his life and no operations

His nocturia has endured over the past five years He has had to strain hard to void, with the nocturia lately occurring every twenty minutes Recently while working at a registration bench he sat four hours with an urgent desire to void, but when he was free he was unable to do so except to pass a few drops with straining Catheter passed easily, but gave severe

pain, which novocain allayed entirely. Had urethritis at age of twenty years, at which time he was circumcised.

Physical Examination.—Teeth Only a few incisors remaining, upper all gone. Thorax: Symmetric expansion good, lung fields clear. Heart: Small, in normal position; sounds somewhat soft and distant, regular in time and force Blood-pressure 98/70 Abdomen negative. External genitalia negative Reflexes: Sphincter tight, prostate boggy in consistency and two and a half times larger than normal. Residual urine 14 ounces.

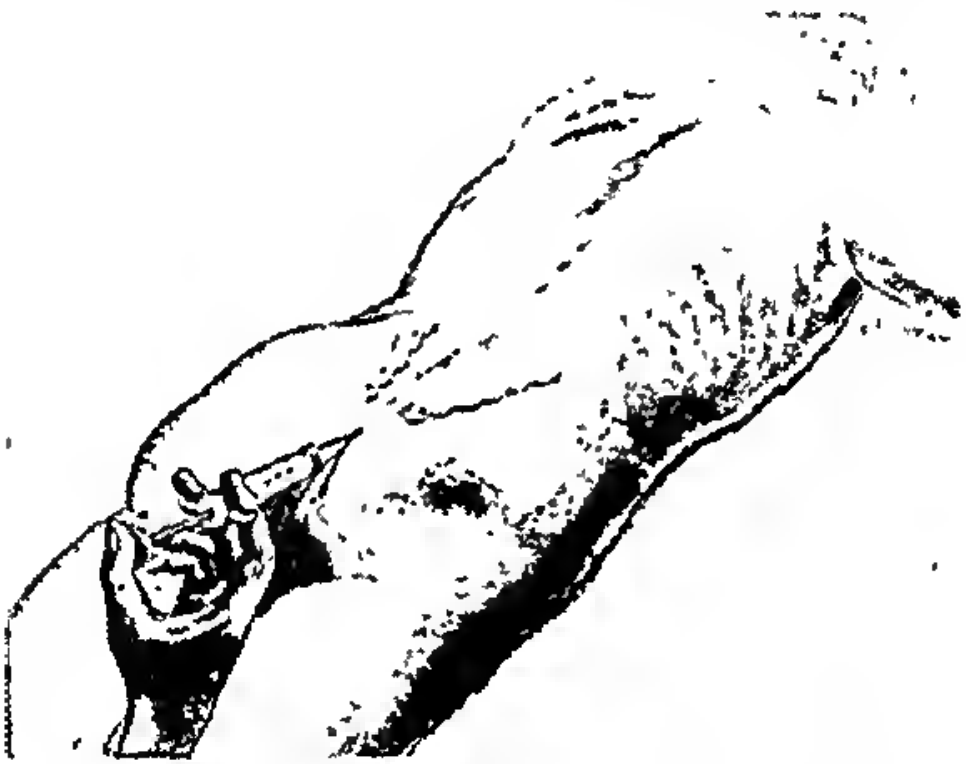

Fig 141.—Superficial infiltration over sacral foramina with needle inserted into sacral canal

Urine analysis shows specific gravity, 1 016; reaction acid, moderate amount of albumin, no sugar. Some red and white blood-cells Wassermann negative. Blood urea nitrogen 28 06 mg per 100 c c. (normal 17.1). Phenolsulphonephthalein output first hour, 15 per cent ; second hour, 17 per cent

Operation.—Suprapubic cystotomy, performed as follows. After the anesthesia was administered in the usual manner, midline incision was made between the symphysis and umbilicus, which was carried down to the fascia and muscle The

peritoneum was stripped back over the bladder without difficulty The bladder was opened at its highest point Digital examination of the bladder revealed a large teat extending from the floor of the bladder neck and causing the obstruction Double suction tube was inserted and the bladder closed with interrupted catgut sutures, the highest being anchored to the fascia and muscle high up A drain was placed in the space of Retzius Muscle closed with interrupted catgut, fascia, with continuous catgut and skin closed with silkworm gut sutures Patient

Fig 142 —Separate wheals are made over each foramen Needle in sacral canal

returned to the ward in good condition Anesthesia 90 per cent perfect

Postoperative Note—Patient complained of some pain throughout the night His blood pressure showed no appreciable change His suction worked satisfactorily The drain was removed the next morning and the wound was clean His general condition is good

His blood urea nitrogen at present is 9 66 mg per 100 c c (normal 17 1) His phenolsulphonephthalein output (intermuscular injection) first hour 22 per cent , second 15 per cent

This patient has been brought to the operating-room and we consider him ready for operation, because

(1) His blood urea nitrogen is well within the normal limit, showing no retention

(2) His phenolsulphonephthalein output is satisfactory, and

(3) His general condition is thoroughly satisfactory.

It is our custom in these cases to do a two-stage prostatectomy. You have already heard the report of the suprapubic cystotomy performed on October 14, 1924. The anesthesia, sacral and parasacral, this morning has been administered in the usual manner. The patient, as you will see, has been placed in the exaggerated lithotomy position, a special tractor having been inserted into the bladder through the urethra without difficulty. I am making the usual curved perineal incision, carrying the dissection bluntly into both ischiorectal fossæ, cutting the central tendon, I have inserted my finger into the rectum and cut the recto-urethralis muscle, thus freeing the bulb. I have cut and stripped back a few fibers of the levator ani, which frees the prostate.

A posterior retractor is inserted and my finger withdrawn from the rectum and glove changed. An inverted V incision is made at the apex of the prostate, leaving the external sphincter intact. I am now making a transverse incision behind the verumontanum, permitting the median lobe to be dissected free. I am now beginning enucleation with the enucleator, but I shall complete it with the finger, removing the entire prostate *en masse*. You will note that there is a very small amount of bleeding. Removing the seminal vesicle tractor, I insert my finger into the neck of the bladder, which I find to be free from tumor. The prostatic capsule I will pack later with gauze. The next step is to insert a small rectal tube through the urethra into the bladder, anchoring it with adhesive tape, after which I shall insert a small catheter through the perineum into the bladder. I have put in one catgut suture approximating the borders of the levator ani and silkworm-gut approximating the skin. The patient is in good condition.

Postoperative Reports.—October 22, 1924: Patient com-

plained of very little pain during the early part of the evening, but required codein later There was a very slight amount of bleeding during the night The perineal packing and tube were removed this morning Patient's blood pressure showed no appreciable change and his general condition is very good

October 24, 1924 The patient has been very comfortable since operation His wounds are clean An indwelling catheter is taking care of the situation His general condition is excellent

November 3, 1924 Patient was discharged with both supra pubic and perineal wounds entirely healed He was voiding through the urethra with almost complete control

Pathologic Report—Hypertrophia fibro-adenomatosa prostatæ Specimen consists of a prostate measuring 7 x 2 x 2 cm consisting of two roundish lobes with a slightly nodulated surface Specimen has been allowed to dry, so that the consistency is hard The cut surface shows the appearance of nodular hypertrophy with some round yellowish white homogeneous spots Microscopic examination shows the features of a fibro adenomatous hypertrophy with a diffuse round cell infiltration of the stroma

RIGHT NEPHRECTOMY WITH PARAVERTEBRAL ANESTHESIA

The patient brought in for this operation was first admitted to the hospital July 29 1924, and discharged August 15, 1924 On admission she complained of pain in her right kidney region of three weeks' duration This pain had been continuous, becoming worse at night She complained of some frequent urination and cloudy urine

Past history reveals rheumatism at the age of fourteen years, recurring each year until the last two years Five years ago her appendix and left ovary were removed, at which time diagnosis of her left ectopic kidney was made

Physical examination reveals a delicate, poorly nourished girl of twenty six years Reflexes are present There are a few fragments of her molar teeth remaining Other teeth in apparently good condition She is pigeon breasted Lung fields are clear

Heart shows no murmurs.

Abdomen shows marked rigidity on the right side, with a very tender spot just above the right iliac crest There is no tenderness on the left side. There is an appendectomy scar about 4 inches long.

Cystoscopy revealed the following.

Bladder appears normal throughout. Lead catheter No. 6 French passed to left kidney pelvis and No. 5 French to right pelvis without obstruction Specimens collected as follows:

Right side.	*Left side.*
No specimen	No pus Phenolsulphonephthalein appears three and a half minutes and 8 per cent secreted in ten minutes after appearance time

No specimen could be obtained from the right side, 20 c c. of 20 per cent. sodium iodid was injected into the right pelvis, and *x*-rays taken. A thick yellow pus came back from the right kidney when catheter was withdrawn. *x*-Ray revealed a low right kidney which showed pyonephrosis.

Cystoscopy and pyelograph show an ectopic left kidney which lies directly over the sacrum.

It was deemed advisable to treat her palliatively because of the possibility of a fused kidney. Repeated dilatation of the right ureter and irrigation of her right kidney failed to relieve her

She was again admitted to the hospital on October 14, 1924, complaining of severe pain in her right side and nausea Her temperature has reached 100.4° F., but has been normal most of the time Wassermann reaction negative Blood-pressure 110/66.

Urine specimen (gr 1 031) showed marked amount of albumin, no sugar, large amount of pus.

Blood urea nitrogen 11.94 milograms per 100 c c. (normal 17.1).

Phenolsulphonephthalein (intramuscular injection), the first hour, amount 20 per cent.; second hour, 8 per cent.; total, 28 per cent.

It is deemed advisable to remove her kidney under paravertebral anesthesia because of the following reasons

(*a*) The continued pain on her right side

(*b*) The lack of improvement under palliation

(*c*) The general condition becoming worse

(*d*) Because there is no functional activity of her right kidney

Operation —The anesthesia has been administered in the usual way I am making a low right kidney incision, carrying it down through the fascia and muscle I have opened the perirenal fascia which I find enlarged anteriorally, and am having considerable difficulty in stripping the fat free from the kidney There is apparently a renal vessel at the upper pole which I have cut and tied The ureter is separated with little difficulty, cut and tied, and cauterized with phenol I am now freeing the pedicle from the surrounding fat and applying the kidney clamp Two double catgut sutures are placed around the pedicle under the clamp, the clamp being loosened while the sutures are tied The kidney pedicle is now cut above the clamp, and I shall take a transfixation suture just beneath the clamp, tying it on both sides The clamp is now removed, the fascia closed with interrupted catgut, the muscle closed with interrupted catgut and the skin closed with interrupted silkworm gut A cigarette drain is placed to the renal pedicle A split rubber tube is placed between the layers of muscle The patient is being returned to the ward in good condition the anesthesia 80 per cent perfect

Postoperative Note —October 25, 1924 Patient complained of considerable pain and discomfort through the night, which required morphin Her blood pressure showed no appreciable change The drain and tube were removed this morning, the wound being clean There was no bleeding and patient's general condition is good

Pathologic Report —Pyonephrosis Specimen consists of a right kidney measuring 12 × 6 × 5 cm The upper half of the organ is of extremely soft fluctuating consistency The ureter arises from a point about 2½ cm higher than the lower

border. On section the upper half of the organ is occupied by a large cavity containing greenish-gray thickened pus. This cavity is the extremely dilated pelvis. The mucosa of the peripheral parts of the pelvis—the dilated calices—is much infected and covered with yellowish-gray masses This cavity is surrounded by a capsule of kidney tissue about 1 cm. thick Here the tissue is of pale brownish-gray appearance and normal markings cannot be recognized. The area next to the pelvis is of yellow color with an irregular borderline against the rest of the tissue. The kidney parenchyma of the lower half is of the same appearance with several yellow spots scattered over the cut surface Microscopic examination shows an extensive increase of the interstitial, fibrous connective tissue densely infiltrated with mostly mononuclear round cells At places we see abscess formation. The tubules of the parenchyma embedded in the increased connective tissue show considerable degenerative changes Some of the glomeruli are closed altogether and replaced by connective tissue, others are relatively intact. The wall of the above-mentioned cavity is lined by a granulation tissue containing many leukocytes

ENLARGEMENT OF THE PROSTATE (TWO-STAGE PERINEAL PROSTATECTOMY)

Patient is a man aged sixty-three, married, admitted September 15, 1924, with acute retention of urine, having complained of nocturia and dysuria for more than a year. The patient's wife and 4 children are all living and well. One child died at the age of twenty-five years, cause unknown. The remainder of the history is irrelevant The patient has been catheterized for the past week, being unable to void at all.

Physical examination at this time revealed the following:

The patient is a well-developed man appearing to be acutely ill.

Reflexes are present throughout. Blood-pressure 140/80.

Abdomen soft and flabby, revealing a mass over the bladder region which percusses dull and is slightly tender.

Rectal examination revealed a tight sphincter and prostate

enlarged about five times the usual size, adenomatous in consistency There was no edema of the extremities

Heart tone shows no irregularity

A soft-rubber catheter passed to bladder without difficulty and released 18 ounces of purulent urine After a short period of bladder drainage with catheters a suprapubic cystotomy was performed September 17, 1924 under local anesthesia and ether Time thirty minutes The operative report is as follows

After the anesthesia had been administered in the usual manner a midline incision was made from the symphysis to the umbilicus The peritoneum was stripped back over the bladder and the bladder opened at its highest portion Digital examination of the bladder revealed an immense median lobe prostate protruding into the bladder, which made it difficult to differentiate from a bladder tumor A double suction tube was inserted into the bladder and the bladder closed with interrupted catgut sutures, the highest being tied to the fascia and muscle high up A drain was placed in the space of Retzius, and muscle closed with interrupted catgut, fascia, with continuous catgut, and skin, with interrupted silkworm gut sutures The patient was returned to the ward in fair condition

Postoperative Note —September 18, 1924 The patient complained of no pain or discomfort throughout the night He is taking fluid well by mouth A Murphy drip was begun and continued throughout the night with 5 per cent sodium bicarbonate in warm saline Suprapubic wound clean Patient is taking water well by mouth No nausea or vomiting The abdomen was considerably distended this morning, but was relieved by a high hot colonic irrigation The patient's general condition is fair

The patient's urine analysis shows specific gravity 1 009 to 1 014 Alkaline in reaction some albumin at times, no sugar, with a great many pus-cells on admission, which have decreased considerably, and which always contain some red blood cells Wassermann reaction ++++

Patient's urea nitrogen (normal 17 1) milligrams per 100 c c was 24 84 on admission Plasma combining power (CO_2

tension) 38 volumes per cent. on admission and 55 volumes per cent. at present.

Phenolsulphonephthalein tests:

On admission		*At present.*	
First hour, amount	16 per cent	First hour, amount	30 per cent
Second hour, amount	19 "	Second hour, amount	28 "
Total,	35 "	Total,	58 "

Patient had some fever on admission, which subsided a few days after operation.

Progress Notes.—Patient's drains were removed the following day, and his suction has been working satisfactorily, keeping the abdomen dry at all times.

x-Ray picture of his kidneys showed no stone. Patient's general condition has been improving slowly. He had been on a meat-free diet, acid sodium phosphate 10 gm. before meals and urotropin 15 gm. after meals. We have forced fluids at all times. Neosalvarsan has been administered at intervals. Triple phosphate, 1 dram before meals, has been given as a tonic Patient has been out of bed since fifth postoperative day

He is considered ready for the second stage of his operation today because:

(1) His blood urea nitrogen is well within the normal limit.

(2) His phenolsulphonephthalein test has reached its maximum and remains stationary.

(3) His general condition is satisfactory.

(4) His plasma-combining power (CO_2 tension) is above 50.

Operation.—Sacral and parasacral anesthesia has been administered in the usual manner, and the patient placed in exaggerated lithotomy position. I am making the usual curved incision in the perineum, carrying the dissection bluntly into both ischiorectal fossæ I have cut the central tendon in midline. I have cut the recto-urethralis muscle, thus freeing the bulb. I have cut a few fibers of the levator ani muscle also, which covered the posterior surface of the prostate, and have

made an inverted V incision through the apex of the prostate and a transverse incision just behind the verumontanum I am completing the enucleation begun with the enucleator with the finger I have removed two moderately large lateral lobes withdrawing the seminal vesicle tractor from the bladder and inserting a finger into its place removing a large median lobe or the prostate from the under surface of the bladder at its neck There is a moderate amount of bleeding I have packed the prostatic capsule with gauze and have inserted a small rectal tube through the urethra into the bladder A rubber tube has been inserted through the perineum into the bladder The borders of the levator ani muscle have been approximated with one catgut suture and the skin closed with interrupted silkworm gut The anesthesia has been 85 per cent successful The patient is in good condition

Postoperative Report —October 25, 1924 There was a moderate amount of bleeding for four hours after the operation, but then it stopped entirely The patient's blood pressure showed no appreciable change although his pulse was somewhat rapid He is taking fluids well by mouth The bladder was irrigated with warm boric solution Patient's perineal packing and tube left in place General condition good

October 28, 1924 Patient's retention catheter is working fairly well His perineal wound is clean but there is some drainage from his suprapubic fistula He complains of no pain but is quite weak

November 5, 1924 Patient discharged

Discharge Note —Patient was discharged with his suprapubic and perineal wounds entirely healed He was voiding through the urethra, but without full control He is to return for further treatment His general condition is good

Pathologic Report —Hypertrophia fibro adenomatosa prostatæ Specimen consists of three roundish pieces of prostatic tissue, soft in consistence with a nodular surface The cut surface is of the typical appearance of an adenomatous hypertrophy The fairly well circumscribed white adenomatous nodules project a few millimeters over the surrounding surface

Her bladder was improved so much with irrigations that we are now of the opinion that it is not tuberculous It is deemed advisable to do a nephropexy on her right kidney because of

(1) Pain in her right side.

(2) Infection of her right kidney.

(3) The kidney will not drain properly in its present position.

(4) By doing the nephropexy we hope to relieve the pain in her right side and give her right kidney good drainage.

Operation.—Paravertebral anesthesia has been administered in the usual manner, and the patient placed on the table with her right side on stretch. I have made the usual kidney incision directly below the twelfth rib, carrying it down through the muscle and fascia. I have opened the fatty capsule at its posterior angle and have enlarged the opening forward, forcing the twelfth thoracic nerve across the middle of the field I have freed the kidney from the surrounding fat and have opened the fibrous capsule of the kidney along the upper pole and middle of the kidney, stripping it back about 1 cm. on each side I bave placed a double catgut suture through the kidney substance to the periosteum of the twelfth rib. I have taken one suture above the middle of the kidney in the same manner I am now closing the fascia and muscle with interrupted catgut and the skin with interrupted silkworm-gut The patient is in good condition, the anesthesia 95 per cent. successful.

Postoperative Report.—October 25, 1924. Patient complained of a great deal of pain through the entire evening, which required repeated doses of morphin. Her dressings were changed and the wound was clean, with only a small amount of bleeding. Patient's blood-pressure showed no appreciable change. Her general condition this morning is good, although she still complains of considerable pain.

November 14, 1924: Patient's wound has been healed since November 1st. She is gaining in weight, and for the past three days has been free from any bladder pain.

November 16, 1924: Patient discharged with kidney wound entirely healed. She complained of no pain or discomfort on voiding. Her general condition is improving slowly and she is to be sent to the country for recuperation